THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

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The events, the people, the products on display in Las Vegas next week
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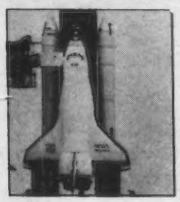

No go
Why the shuttle 'Discovery' didn't fly last week/**13**

DP crime bill toughened

TRW data base breach triggers legislative action

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Reacting swiftly to the alleged TRW, Inc. credit data base break-in (see story on page 2), the U.S. House Judiciary Committee last week approved a bipartisan computer crime bill that was expanded to make it a federal crime to "hack" into credit and other data bases protected by federal privacy statutes.

The Counterfeit Access Device and Computer Fraud and Abuse Act of 1984 (H.R. 5616) was approved by voice vote and sent to the full House of Representatives, but only after it was amended by Rep. Dan Glickman (D-Kan.) to cover cases similar to the much-publicized TRW hacking case.

Committee members repeatedly referred to the recent disclosure that hackers had breached the TRW Information Services Division's credit file on 90 million people; the hackers reportedly could read the files but not tamper with them.

Glickman complained that the bill, as written by the panel's Subcommittee on Crime, failed to address cases where hackers gain unauthorized access to confidential data bases but reap no financial gain, as in the TRW case. His amendment said it is a federal crime to obtain unauthorized computer access to information protected by the Privacy Act and the Fair Credit Reporting Act.

In general, the bill creates several categories of federal misdemeanors and felo-

See **CRIME** page 2

AT&T takes wraps off long-awaited personal computer

By Eric Bender
CW Staff

NEW YORK — AT&T has launched its first personal computer, the AT&T Personal Computer 6300, said to be operationally compatible with the IBM Personal Computer. The machine runs popular software up to 80% faster than the IBM machine and sells for approximately 5% less, AT&T said.

The long-awaited announcement brings a formidable competitor into the personal computer arena, industry analysts agreed. However, most commented that the 6300 is a competitive rather than a spectacular introductory product.

Predictions varied widely on how the giant company will fare in the crowded personal computer market. "The biggest question is whether it can become a business computer industry marketer," observed Everett Meserve, senior consultant with Arthur D. Little, Inc. in Cambridge, Mass.

System specs

The AT&T Personal Computer 6300 is an Intel Corp. 8086-based system with graphics adapter, high-resolution display (640 by 400 pixels), seven expansion slots, a serial port and a parallel port that come standard. A version with 128K bytes of random-access memory, operating system and dual 360K-byte disk drives sells for $2,810, while a model with 256K bytes of RAM, operating system, one floppy disk drive and one 10M-byte hard disk drive will cost $4,985. The maximum RAM is 640K bytes.

As predicted, the 6300 is being built by Italy's Ing. C. Olivetti & Co. and is a version of Olivetti's M24 system, which was introduced

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TOP OF THE NEWS

View from the top: IBM President John Akers is affable, easy-going and unassuming. In an exclusive interview with *Computerworld*, he talks not only about himself, but also about the directions in which his organization is going. **Page 7.**

■

New on the machine front: AT&T Information Systems, Inc. announced the Information Systems Network, wired in a star configuration **(Page 5)**; IBM introduced two graphics workstations based on its 3270 Personal Computer **(Page 8)**; Compaq Computer Corp. unwrapped four desktop micros that the company claimed are two to three times faster than the IBM Personal Computer **(Page 8)**; and Data General Corp. unveiled three systems that are based on its MV/4000 superminicomputer **(Page 10)**.

■

Banked in Boston: A Hub bank has an on-line system that allows individuals and small businesses to do their banking via personal computers. **Page 53.**

■

Gimme shelter, Franklin Computer Corp. asked a Philadelphia court as it filed for protection from bankruptcy. **Page 73.**

■

PRODUCT SPOTLIGHT

Planks missing in the micro-mainframe drawbridge

"The micro-mainframe link was unheard of only a year ago. People say it is a technology in its infancy, but it is more like prenatal. These products are just the tip of the iceberg. We haven't touched the potential capabilities of the link yet."
— Philip H. Dorn, president of Dorn Computer Consultants, Inc.

By John Gallant
CW Staff

In the distance, across a technological moat, there stands the shining mainframe castle filled with a fabled wealth of corporate data. To the workers in the fields, wielding their hard-won microcomputer tools, access to the castle's inner chambers holds the promise of timely information and greater personal productivity — treasures at which the micros hinted but were often unable to unearth alone.

The moat dividing the micro and mainframe realms is vast, filled with incompatible data formats, inefficient communications methods and security hazards. Beyond, the data store is watched by DP guards worried that end-user access may pose problems for the corporate kingdom. And should the worker win entrance to the vaults of information at last, he may find the mainframe data riches simply too large and unwieldy to transport back to the micro workplace.

But the workers are not without allies in the quest for data access. Among their supporters are DP professionals eager to use the corporate information resource better and an increasing number of software vendors offering the modern-day equivalent to the drawbridge — the microcomputer-to-mainframe link.

The micro-mainframe link is certainly *the* hot topic in the software community today — a topic that has generated more smoke than fire [CW, Jan. 2]. Industry analysts and software company executives agree that the term has been abused by vendors rushing headlong to fill a market vacuum created by real end-user needs.

A growing number of the major software houses and a variety of independent companies have announced links of late (see story on page 16). But the majority of those products have only recently been delivered. Most links have faced little real testing in a production environment, and users have had scant opportunity to evaluate the competing and often confusing capabilities touted by eager marketers.

"Vendors have probably done themselves and users a disservice by labeling everything from a $100 cable to a $100,000 mainframe package a micro-mainframe link," said John Crocker, executive vice-president of On-line Software International, Inc.

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NEWSPAPER

TRW password theft refocuses attention on security

Incident reaffirms that no security system is invulnerable

By Jeffry Beeler
CW West Coast Bureau

ORANGE, Calif. — A recent incident involving the theft of a major credit bureau's subscriber password has shifted the spotlight of national attention once again to the subject of information security.

The episode, which has triggered unsubstantiated reports of a data security breach at TRW, Inc.'s Information Services Division here, also dramatizes the vulnerability of even the most elaborately protected system to electronic intrusion.

"We've shown that we take very seriously our public trust to keep the information [in our data base] secure," said Delia Fernandez, the TRW division's public affairs director. "We developed many of the security procedures that were later adopted by federal legislators to regulate the entire credit-reporting industry."

Even so, Fernandez readily admits imperfections in her company's data security safeguards. "If there have ever been any press accounts in which I've said our security is perfect, I was misquoted," she said. "As one of our people once pointed out to me, the only truly secure computer system is one that is shut down."

Unavoidable chinks

The unavoidable chinks in TRW's systems security precautions have led occasionally to unauthorized accesses of the company's data base, which contains confidential credit histories on tens of millions of individuals.

Perhaps the most serious violation occurred a few years ago, when investigators uncovered a scheme in which thieves repeatedly penetrated the company's system and copied files belonging to people with good credit histories. The purloined information was then sold to "customers" with poor credit ratings and used to obtain loans and charge cards the buyers would otherwise have been denied [CW, Jan. 12, 1981].

In late May, an unidentified phone caller informed TRW of the theft of a subscriber password that the credit bureau had issued to a Sears Roebuck & Co. store in Sacramento, Calif. The informant also told TRW that the password was making the rounds of electronic bulletin boards in Southern California and was being used by hackers to gain illicit access to the firm's data base. Then, in mid-June, the credit bureau received a second such phone call from a *Newsday* reporter, who repeated basically the same allegations and produced the stolen password as proof.

Credit card fraud

"From what we've been able to gather from the reporter and the anonymous informant, the purpose of the alleged accesses was credit card fraud," Fernandez said. Both callers portrayed the purported break-ins as the electronic equivalent of fishing through trash cans and dumpsters in search of discarded receipts bearing credit card numbers.

TRW officials immediately canceled the Sacramento store's subscriber password and issued a new one. They also checked with four electronic bulletin boards in Southern California and compared their own company's billing records with similar information at Sears, Fernandez said.

Neither search uncovered any irregularities, discrepancies or other evidence to suggest that the stolen password had ever been used to enter TRW's data base illicitly, she said.

Fernandez conceded, however, that the results of the company's investigation were far from absolute proof that no breach of TRW's data security had taken place. If a hacker obtained all the necessary passwords and other user identification, an examiner of Sears' and TRW's billing records would probably be unable to distinguish between an unauthorized systems entry and a legitimate access, she said.

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nies for unauthorized access to computers to obtain money, goods or services or classified information. Besides the Glickman amendment, the major provisions of the bill are:

- The bill applies to computers used by the federal government or used in interstate or foreign commerce, which would cover any system accessed by interstate telecommunications systems.
- It creates a specific federal felony for unauthorized access to computers if the defendant reaps $5,000 through computer fraud in one year or if the defendant accesses classified information.
- It creates a misdemeanor crime of computer abuse if the defendant uses, modifies or discloses information in a computer and the defendant gains $5,000 or more in one year or the computer is operated by the federal government.
- The penalty for misdemeanors is a $5,000 fine and up to one year in jail, and the penalty for felonies is a fine of $10,000 and up to 10 years in jail.
- Both the Federal Bureau of Investigation and the Secret Service have jurisdiction over computer crime investigations under this legislation.

States' responsibilities

Rep. William J. Hughes (D-N.J.), chairman of the crime subcommittee that produced the legislation, said it contains the $5,000 threshold and applies to interstate commerce so that smaller, intrastate crimes can be handled by state governments. In fact, Hughes opposed Glickman's amendment on grounds that it would intrude on state authority to prosecute small-scale computer trespass crimes.

In the legislative process, this computer crime bill — linked to a credit card fraud bill — has overtaken the more comprehensive version (H.R. 1092) that is stalled in another subcommittee, and it is expected to gain House and Senate approval quickly [CW, May 21]. It has been supported by much of the DP community, including the Data Processing Management Association and the EDP Auditors Association (EDPAA).

John T. Vanadia, co-chairman of the EDPAA government liaison panel, praised the committee action and urged Congress quickly to enact this bill and any subsequent legislation needed to curb computer-related crimes. In addition, he said, the legislation should be supplemented with education of criminal prosecutors so the law can be fully effective.

CORRECTIONS

Decmate II OS/278, a new version of the OS/8 operating system for the Digital Equipment Corp. Decmate II microcomputer described in *Computerworld*'s June 11 issue, is available not from DEC, but from the Digital Equipment Corp. Users Society (Decus).

More information is available from Decus, which is located at 249 Northboro Road, Marlboro, Mass. 01752.

Due to a reporting error in the June 18 Computer Industry section of *Computerworld*, Icot Corp.'s third-quarter financial statement was said to include $1.7 million in sales of micrographics products and services. The revenues from that division, which was sold July 30, 1983, were in the third quarter a year earlier.

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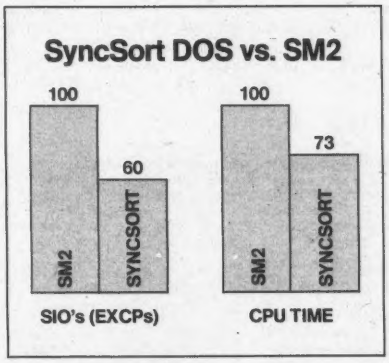

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- **Record Formatting** — Powerful features like INCLUDE/OMIT, INREC/OUTREC, SUM and others — with capabilities like data conversion, editing, insertion of literals.
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in Europe last April. The AT&T machine differs only "in styling and in the software that's available," said Frank Vigilante, president of Product Management and Development, AT&T Information Systems, Inc.

Among software packages AT&T announced for the 6300 at the micro's debut are Ashton-Tate's Dbase II ($240); Digital Research, Inc.'s Draw ($295), PL/I ($750), C ($350), Pascal/MT+ ($600), CBasic Compiler ($600), Dr. Logo ($150) and Graph ($195); Lotus Development Corp.'s 1-2-3 ($495); Micropro International Corp.'s Wordstar/Pro ($695); and Microsoft, Inc.'s Multiplan ($195), Word ($475), Pascal ($350), Fortran ($350), Cobol ($700) and Macro Assembler ($100).

AT&T has signed distribution agreements with five major computer store chains (Computerland Corp., Sears Business System Centers, Microage, Inc., Compushop and Amerisource).

The system is already on display at 250 outlets, AT&T Information Systems Chairman Charles Marshall said, predicting that over 800 outlets will handle the system by year-end. AT&T also intends to market the personal computer through its direct sales force.

Softeam pact

AT&T also has signed an agreement under which Softeam, a distributor based in Compton, Calif., will certify software for the new system. Over 100 programs have been successfully tested to date, and dozens more have been certified by software vendors, AT&T said. AT&T plans to solicit additional proprietary graphics and other software, Vigilante said.

In addition, AT&T disclosed pricing and availability for its PC Interface software, which links MS-DOS machines (the 6300, the IBM Personal Computer and compatible systems) to the previously announced 3B2. The packages are priced at $500 for the 3B2 version and $100 for each personal computer.

Initial shipments begin next month. The software will be generally available in October.

The software allows the 3B2 to act as a hard disk drive for the MS-DOS machines, converting files to Unix formats for storage on the larger machine, AT&T noted. Links through RS-232 ports will be established when the software is delivered,

The AT&T Personal Computer 6300

while the hardware required for higher speed links through AT&T's 3Bnet and other communications options will be offered in the fall.

AT&T's new Context Switch software, which also made its debut last week, permits 6300 users to switch between MS-DOS stand-alone applications and Unix terminal emulation with a single keystroke. "With a flick of the key, you can suspend that [MS-DOS] application and switch to the Unix system and run a Unix application" or vice versa, Vigilante maintained.

The Context Switch will be available for $100 in August, while an associated package permitting the 6300 to emulate an AT&T 4410 terminal will cost $100 when delivered next month.

The company also disclosed plans to sell its 3B2/300 supermicrocomputer and 3B5 minicomputer through its direct sales force and unveiled a host of software for those two systems.

More information about last week's announcements is available from AT&T Information Systems at One Speedwell Ave., Morristown, N.J. 07960.

Analysts debate whether AT&T's strengths will hold up in micro mart

By Eric Bender
CW Staff

Predictions vary widely as to how far AT&T Information Systems, Inc.'s obvious strengths — its tremendous business and financial resources, high name recognition and world-leading R&D — will translate into personal computer sales.

"AT&T is a major, major entrant that wields a great deal of force," said one official at Compushop, a Richardson, Texas-based computer chain carrying the AT&T Personal Computer 6300. "We've already had customers coming in asking to look at the AT&T personal computer.

"AT&T has incredible technology and really good people that we've been working with for almost a year," the official said. "Second, they have a very good product. Since it runs MS-DOS, it runs all the inventory of software that I have for the IBM [Personal Computer]. Third, being who [AT&T] is, we expect big communications additions to the product."

Others downplayed AT&T's entry into the personal computer market, citing reports that IBM plans to launch a more powerful personal computer in the near future. "At this stage of the game, the personal computer market is pretty well established," said Stephen Caswell, analyst with Trigon Systems Group in Toronto. "AT&T is just one more player in the game. [Does it] think the AT&T name is magic?"

AT&T has worked very aggressively to offer a broad line of computer systems, and it offers products "at least as good as or better than those from most of its competitors," said Everett Meserve, senior consultant with Arthur D. Little, Inc. of Cambridge, Mass. But the basic question is "whether it can become not a technical purveyor of good equipment, but a good marketer."

Meserve suggested that AT&T should remember Digital Equipment Corp.'s checkered history with personal computers: "DEC got immediate attention from the major chains, including [Computerland Corp.]," but expectations have not been met, and the Computerland agreement fell through last month. DEC's sales were disappointing not for lack of good products, but for lack of experience "in being a marketer in the business computer world," Meserve commented.

'Marketplace doesn't wait'

"The marketplace doesn't wait," AT&T Information Systems Chairman Charles Marshall commented as the firm finally introduced its first personal computer last week. "I thought we were a bit tardy, frankly."

AT&T has professed eagerness to meet competition on retail shelves and in customer offices. "We're ready for that electronic high noon," Marshall claimed.

Although AT&T personnel often are faulted for lack of familiarity with general-purpose computers, "we have recruited 20% of our present sales force from the DP industry," said Robert Casale, AT&T Information Systems president of marketing and sales.

Later this year, AT&T is expected to introduce a line of Unix-based desktop systems built by Convergent Technologies, Inc. Company officials declined to give details, but Frank Vigilante, AT&T Information Systems president of product management and development, acknowledged "some gaps in our product line that we want to fill.

"We decided to start with an MS-DOS box," Vigilante said. "A lot of our customers wanted it, and we didn't have the software" to start with Unix. He added that "we're gravitating in some obvious directions."

FCC upholds private-line rates

WASHINGTON, D.C. — Present private-line tariffs will continue for some time, the Federal Communications Commission decided in effect last week. Based on the commission's actions, present private-line rates will remain in effect until a new tariff filing is submitted by AT&T and accepted by the FCC, which could be several months.

AT&T also was told that proposed changes in ordering, maintenance and service provisions of its Message Toll Service and Wats are "vague, inconsistent and unclear." Until changes are filed by AT&T and accepted by the commission, the existing provisions will remain in force.

The FCC rejected AT&T's proposed private-line tariff, originally filed last October, because it found that AT&T failed to "independently cost-justify" the charges for local access facilities obtained from divested Bell operating companies and other local exchange carriers. Instead, the commission said, AT&T used the same cost-justification methodology employed by the local carriers, which was found unlawful in an order issued June 7 [CW, June 18].

Besides acting on tariffs last week, the commission also modified its Second Computer Inquiry decision. Specifically, AT&T and nine divested Bell operating companies won permission to market basic net services through their separate subsidiaries.

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AT&T announces ISN local-area network scheme

By John Dix
CW Staff

NEW YORK — AT&T Information Systems, Inc. announced here last week the Information Systems Network (ISN), which provides local-area network features but is atypical in that it does not provide for the sharing of cable and is wired in a star configuration.

ISN shares its basic architecture with AT&T's previously announced Datakit Virtual Circuit Switch. Datakit was designed primarily for internal telephone company applications, while the ISN is targeted at commercial users, explained Dennis Morgan, head of AT&T Information Systems' Local-Area Development Department.

ISN enables users to support remote asynchronous devices at speeds up to 19.2K bit/sec over existing twisted-pair telephone wire. Access to any Digital Equipment Corp. system that runs Unix and AT&T's 3B Unix-based hosts is achieved via fiber-optic cable at 8.64M bit/sec, the speed of ISN's internal bus.

Multiple access

That statistically multiplexed bus is at the heart of the ISN central packet controller.

The packet-switching architecture of this device, built on top of the bus, provides for multiple access to the device.

By comparison, bus and ring networks use multiple-access methods, such as carrier-sense multiple access with collision detection (CSMA/CD) and token passing, respectively.

The packet-switching capabilities of the switch, in conjunction with the bus, distinguish ISN from data switches, or data private branch exchanges (PBX) as they are sometimes called, provided by such companies as Gandalf Data, Inc. and Micom Systems, Inc.

With ISN, remote devices are wired into the central packet controller in a star configuration. Data from each supported device is gathered and packetized — to be multiplexed together over the bus — by internal modules.

"When one or more modules has data to transmit on the bus, they go through a contention period, and then data is transmitted. If a module determines that it is not going to be the winner of the contention, it gracefully backs off," Morgan explained.

Round-robin scheduling

Under extremely heavy loads, when communications requests are more likely to be forced into a queue, ISN is said to use a type of round-robin scheduling, with each module transmitting in its turn.

According to Morgan, delay prediction studies, theoretical queueing analysis and actual measurements performed by the company have shown that this access method compares "extremely favorably" with others, including CSMA/CD and token passing.

When users want to support large numbers of devices, another ISN component will come into play: remote concentrators.

Instead of directly wiring all ISN-supported devices back to the packet controller, users can install these concentrators in PBX wiring closets, typically used in large installations as gathering points for telephone wires.

Remote concentrators are then wired back to the central packet controller, using fiber-optic cable.

The location of the packet controller will depend on which department within an organization buys the device, said Joe Wood, a supervisor within the architecture group of Morgan's department.

"If data processing bought ISN, it may be located in the DP department with a user's host," Wood said. "If bought by the telecommunications department, users may install it in the PBX room."

The ISN packet controller comes in three physical versions. The average cost per port is $400 to $500.

The 70-in. controller can support a maximum of 1,920 asynchronous devices, as well as house battery back-up and provide for modem pooling. A 40-in. version can support the maximum number of terminals, but cannot house either batteries or modems.

A 21-in., entry-level ISN can support a maximum of 400 ports. Morgan said that he believes the 21-in. version can be cost-effective when as few as 100 of the ports are used. To support even greater numbers of devices, ISN packet controllers can be networked together, at distances up to 5,000 feet, using fiber optics.

A maximally configured packet controller, supporting 1,920 ports, can actually provide simultaneously full-duplex connections between only 1,220 devices.

Connection to the company's Dimension System 85 digital PBX is achieved with a fiber-optic cable. Up to 40 simultaneous 19.2K bit/sec connections can be supported.

Customers benefit from this marriage in expanded connectivity and the ability to do network administration and maintenance for both systems from a single point, Morgan said.

AT&T Information Systems is located at One Speedwell Ave., Morristown, N.J. 07960.

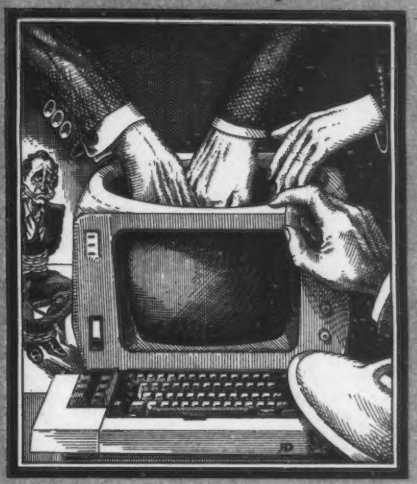
System Accounting in VM

Who Has Their Hands in Your Information Center?

Just six months ago, you told your executive committee that the proposed computer system for your Information Center would meet the corporation's needs for two years. Now it seems the system will be saturated in the next two months. Your chief executive wants to know why.

Your staff is able to identify individual users, but cannot track each user's resource consumption. You cannot identify where the overrun is.

System accounting in a VM interactive environment inherently demands a different approach than you may expect. VM just doesn't provide the raw accounting data offered by other systems. Still, you need to account for system and resource usage in your VM Information Center.



PERSPECTIVE

Many MIS and DP executives began their careers in the MVS environment, and consequently view system software product evaluations from an MVS perspective. A *VM based* Information Center though, simply does not fit into the MVS world. That is not to say that VM is inherently better; it's just very different.

HISTORY

MVS has been a strategic product for IBM since at least the early 1970s. This strategic "label" caused IBM to devote substantial development resources, over a long period, to enhancing MVS and all of its component parts. The success of this long term effort shows today. MVS is a robust, full featured, reliable, and stable *batch* operating environment. But as an interactive support environment, it is seriously deficient in terms of productivity and end-user friendliness.

This deficiency created the need for VM. The explosive growth in the number of VM sites is largely due to VM's clear superiority over MVS as an interactive decision support environment. As the Information Center and Development Center concepts grew in popularity, IBM labeled VM as a "highly strategic" product and began to devote extensive development resources to enhancing the product. IBM's VM development team is moving aggressively to close the enhancement gap between MVS and VM.

SYSTEM ACCOUNTING

A good example of the difference in relative sophistication of features between MVS and VM internals is in system accounting.

MVS allows you to collect over 200 different types of records from the Systems Management Facility (SMF) and the Resource Management Facility (RMF). Independent software vendors have created products that allow this SMF and RMF data to be summarized and reported in a myriad of useful ways. The key to this success is that MVS itself offers native realtime collection and management of these records in the SYS1.MAN data sets.

VM in contrast produces only six basic accounting records. Many more are required before system accounting in VM will reach the level of sophistication enjoyed by MVS. No software vendor can build a VM accounting product as complete and strong as the existing MVS products because the raw data just isn't available in VM. Many enhancements to MVS accounting came as a result of pressure from IBM user groups. These groups are placing similar pressure now on IBM to enhance VM accounting. VM *will* evolve substantially, but you need resource accounting now.

YOUR ACCOUNTING NEEDS

What is important to the MIS or DP manager in an interactive decision support environment? The accounting demands of MVS and VM system accounting are externally similar, but with significant internal differences. The needs are the same, but the implementations are different.

Let's look at your needs from an overall management perspective. First, if you are running an Information Center under VM, you don't have the control over resource consumption that you would under MVS, nor do you have the predictability of the timing of resource demand. Other departments can consume huge portions of your resources without notice, and worse, without accountability.

Next, you may be forced to fund large software purchases for another department with no way to recoup the cost or even determine whether the acquired software product is being used.

Similar problems exist in project accounting. You must be able to track expenditures to budget and enforce budget controls by project.

To be accurate in a VM environment, this data must be collected realtime. Batch accounting is sufficient for a batch environment, but for pure interactive work, only realtime accounting is timely enough.

Of course you also require the ability to do the traditional system accounting functions of invoicing, management reporting, auditing, and security enforcement.

WHAT IS YOUR SOLUTION?

The senior developers at VM Software Inc. have the experience to force an accounting system to meet these needs through extensive modifications to VM internals, but this would be a serious mistake. IBM is moving so aggressively to enhance VM that there is no way to ensure that internal modifications to VM made by an independent software vendor today will operate on the next VM release. This is an assurance you must have before you acquire any software package. An effective VM accounting system *must* work within the existing framework of the VM environment, yet allow for future VM growth.

We at VM Software Inc. have developed six products that work together to help you run your VM Information Center more efficiently. VMACCOUNT meets the resource accounting needs discussed above. Perhaps more importantly, VMACCOUNT is specifically designed to grow in sophistication as IBM enhances VM to collect and report more detailed data on system usage. VMSI, as the leading vendor of VM system software products, understands the intricacies of VM and the needs of VM Information Centers. VMACCOUNT is designed to meet these needs, now and in the future.

VM Software Inc.
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JOHN AKERS

To those familiar with the pantheon of names associated with IBM in recent years — Watson, Opel, Cary — the name of John Akers was something of an unknown until a year ago February, when Akers was named president of the company.

But Akers was quite familiar to IBM's upper management, who had tracked his progress from the time he joined the company in 1960 as a sales trainee to his elevation to senior vice-president two years ago.

Along the way to the president's office, Akers held just about every marketing position at IBM. The Yale graduate and former carrier-based Navy aviator now has worldwide functional responsibilities, with the senior vice-presidents of the company's Americas Far East Corp., Europe/Middle East/Africa Corp. and U.S. operations reporting directly to him.

An affable and plainspeaking individual, Akers' candor and easy manner do much to shatter the stereotype of a typical IBM executive as the blue-suited, stodgy businessman. Akers personally greets visitors in his office foyer, drinks iced soda from a paper cup and sits in a large, airy but wholly unassuming and unintimidating office.

Akers was interviewed at IBM world headquarters in Armonk, N.Y. June 19 by Computerworld *Senior Editor/Computer Industry Peter Bartolik.*

Q *IBM is sometimes perceived as a very conservative, bureaucratic organization, manned by a corps of blue-suited marketing types, but lately we've seen Charlie Chaplin representing the company on television. Where does John Akers fit between those two extremes?*

Well, I don't think I'm the little tramp of IBM. I also don't think I'm "the blue-suited marketeer," although I grew up in marketing. I had all the jobs, almost all the jobs, that we can have in marketing. And then in 1976, I got involved in finance and planning, resource management and so forth, and then the last couple of years before this job, I was the group executive of the communications group, so I had product management responsibility. So I don't know where I fit. . . . I suppose I'm somewhere in the middle.

Q *What do you see as the future image of IBM — Charlie Chaplin or the conservative, blue-suited guy that's speaking to the business community?*

IBM is really a business that does its development and manufacturing and research activities all around the world, and the marketing and service operations are remarkably similar. You go to Germany, they're all Germans; you go to Japan, they're all Japanese; you go to South Africa, they're all South Africans; and here they're all U.S., but they look and act and conduct themselves about the same way. So I think IBM, perhaps, has a more human perspective, at least is viewed as more human than in the early days of computers.

We have certainly been conservative in the financial management of the company. We have been conservative, I suppose, since the early days of Tom Watson Sr. and his desire to have the sales force not look like a bunch of flashy, easy-come, easy-go salesmen, but as businessmen. I'd like to think that people around the world view the IBM company as a well-managed, constructive force in the societies in which we work. We try to conduct ourselves that way, and by and large I think we do a pretty good job.

Q *IBM mainframe products are the result of long-term development strategies within the company. With the Personal Computer, IBM has essentially pieced together the products of other vendors. You've also got a number of joint ventures going, equity partnerships with Rolm Corp. and Intel Corp. Where is this leading? What is IBM going to look like in 1990?*

The [computer] industry is characterized as a $250 billion business around the world. It's enormous. In order to participate in as much of the opportunity in that ever-broadening industry, it became pretty clear that we couldn't do everything ourselves. . . . We could not rely exclusively on our own semiconductor facilities; we could not rely upon our own manufacturing facilities. We've used vendors a lot over the years, but we're using vendors a lot more these days than we ever have in the past.

It would make sense to realize that IBM's talents aren't the only talents necessary to be successful. So we're prepared to enter into partnership agreements . . . and that's true not only in the U.S., that's true overseas. Five years ago, you'd find no joint efforts in Japan. Today we have a half dozen. That's just one market example.

Q *What are some of the more promising new technologies or market niches that you feel IBM can exploit?*

I think the business areas that afford the most growth opportunity for us in the next five years are personal computers and workstations; communications products — our participation in the communications world is certainly modest; software of all kinds, both systems software and applications software; storage products, from high to low, both hard disk and floppy disk.

And in the final analysis, I think one of our great strengths is our systems capability, whether it be the packaging and putting together of a computer system technically and technologically or the implementation of complex systems in the marketplace.

Q *How about the mainframe area — would you characterize that as being very mature at this point?*

The larger processor product line from IBM today is a very successful one. It's enjoying continued strength in the market in spite of a lot of doubting Thomases who seem to suggest it isn't. I really believe that product line and successor products will be good growth products for IBM.

Q *It's been said that IBM's goal is to become a $100 billion company by 1990. It would seem that type of goal would require the company to stress the sale of new machines rather than less revenue-producing field enhancements or upgrades. Are you concerned at all that users might feel IBM is forcing them to take new boxes every few years, just to meet the growth goals?*

We don't force anybody to do anything. We try very hard and sometimes better than others to develop products that will make our customers the most satisfied set of customers ever.

Sometimes you can upgrade products that are already in the field; sometimes you can't. And after a period of time, as technology continues to march, it becomes clear you have to bring a whole new product line to the market.

So I think you'll continue to see IBM doing both. It is certainly in the customer's best interest to upgrade when he can and when we technologically can. But at some point in time, when you start over again with the system from scratch, you're able to put together performance and quality that you really can't match by continually upgrading what you already have.

Q *IBM's growth last year exceeded the total sales of Digital Equipment Corp., which proclaims itself the No. 2 computer vendor. Are you concerned that IBM's continued rapid growth will lead to a public perception that the company dominates its industry to the detriment of the computer business in general?*

No. The industry is a large industry. It's five to

six times the size of the IBM company. If IBM grows at 15% this year, which would keep pace with the industry, that's about a $6 billion growth, so somebody else is getting $32 billion.

So we don't dominate the industry, number one. Number two, the track record of IBM in court over the last 15 years is pretty self-evident, and that is, we haven't done a single thing wrong; we try to conduct ourselves — and I think we do — in a completely ethical and straightforward way.

There is perceived and actually enormous opportunity for lots of people. And no, I don't think that antitrust actions are on the horizon.

Q *The European Economic Community (EEC) action against IBM deals to a great extent with the issue of IBM-compatibility or compatibility with IBM. What is your opinion of the actual charges involved in the EEC issue and the larger issues of vendors, whether they're making mainframes or microcomputers, piggybacking IBM technology?*

The [EEC] commission states that we dominate the [computer] market and we abuse that dominance by not making available enormous technical information at the time we announce a product, or shortly thereafter, for the benefit of our competitors.

It's important to remember that not one user in the European community has complained; not one competitor in the European community has complained. The only complainants are Memorex Corp. [a Burroughs Corp. subsidiary] and [Amdahl Corp.], and they're the ones that lost in the courts of the U.S. We have always made information available in great amounts for our customers, because that's in their best interests and therefore in ours.

We have never felt it necessary to make technical information available for the benefit of our competitors. I don't know anybody, in any industry, who does that. And I don't know where anybody, including the European commission, gets the authority to demand that a company, particularly a technological company, should give away the fruits of its research and development, because that's what they're asking us to do. And we're not going to do that.

We're not going to do that, and, as a matter of fact, it would be extraordinarily dangerous to establish the precedent that says that benefits of the research and development of company A, being a leader in its industry, ought to be shared with its competitors.

Q *What about the compatibles, the corporations essentially selling into a market that you have established through your technology? Does the company as a whole resent that?*

No, I don't resent it at all. I think that it's a relatively risky strategy for a company not to innovate itself, but rather respond and either copy or emulate that which somebody else does. By definition, somebody else is setting the game. So it wouldn't be a strategy I'd pick.

I have no problem with people who want to be in that business, just so long as they do it ethically and fairly. I don't think they should steal our secrets, and I don't think a government should force us to give them to them. Beyond that, I don't have a problem with it.

Q *This past spring, you said IBM takes the Japanese very seriously. Do you believe IBM is competing against "Japan, Inc.," or is it, in fact, competing against individual Japanese firms?*

I think, bottom line, we're competing against individual Japanese firms. I think the business environment in Japan that the government helps create is very helpful to them. . . . But in the final analysis, it's the Hitachis and Fujitsus and NECs with the executions of their business actions that result in good or bad products, and they're doing a good job. They are bringing to the market exciting new products. They, like others in the Japanese business community and other industries, do a good job of developing and manufacturing products of low cost and high quality.

Q *What is your view of AT&T's ability to compete in the information technology industry?*

The technical capability of AT&T — their understanding of applications, their software experience led by their Unix operating system — all give them a pretty good base. Now they're going to have to learn to take those capabilities and learn to merchandise them and persuade the marketplace that their products are good and that their support and service is good.

I think the marketplace is prepared to listen very carefully, and I think that AT&T will learn and will get better, so I'd expect that they're going to be very successful in the business.

Q *Tell us a little more about yourself. Describe a typical day — how many hours you put in and what types of problems come across your desk.*

It depends upon whether I'm traveling or not. I've traveled an awful lot in the last year and a half. . . . I have majored on the world trade part of the IBM company over the last 18 months, and I've visited some 20 countries in that period of time.

I live in Westport, Conn., so I drive to work. It takes me about 45 minutes. I usually get here about 8 a.m. or a little after, and I go home

See **AKERS** page 8

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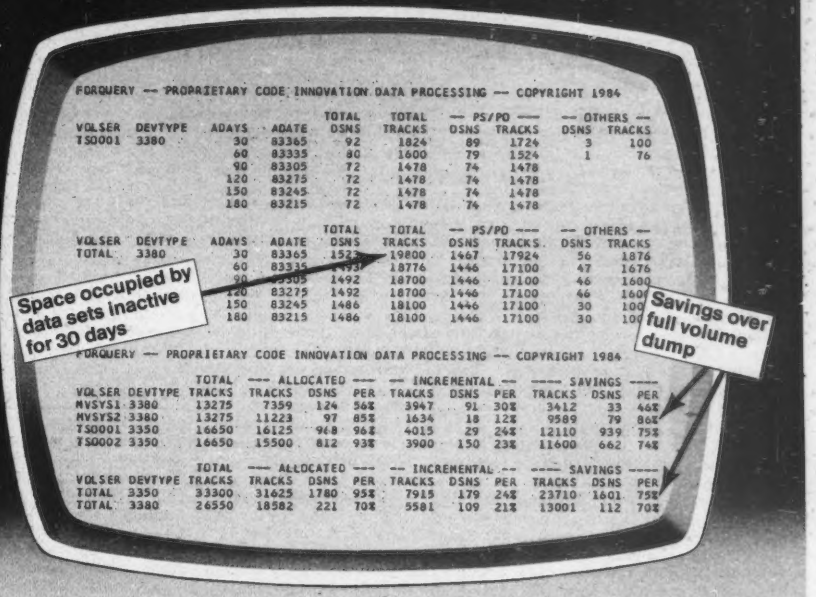

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IBM bases graphics units on 3270-PC

By Eric Bender
CW Staff

NEW YORK — IBM last week unveiled two graphics workstations based on its 3270 Personal Computer (3270-PC), along with related graphics software, a desktop ink-jet printer and IBM's first mouse input device.

The two workstations are designed for business professionals, engineers and scientists who need sophisticated graphics manipulation capability or the ability to produce documents combining images and text, IBM said.

Restricted graphics functionality had been a significant drawback for the 3270-PC, some industry observers pointed out. "One company shipped 10 IBM 3270-PCs back to IBM when it learned of its limited graphics ability," recalled Marty Levin, a Colorado Springs, Colo., consultant.

Data in vector form

IBM's newly introduced 3270 Personal Computer/G (3270-PC/G) and 3270 Personal Computer/GX (3270-PC/GX) can receive picture data from a host computer in vector list form rather than programmed symbol form, reducing the host-to-workstation data stream by up to 70% and shortening host processing time by up to 80%, the company claimed. The 3270-PC/G and 3270-PC/GX also can manipulate a picture locally without going back to the host computer, it noted.

The new systems feature greater graphics display abilities than those offered by standard 3270-PCs. The 3270-PC/G offers a 14-in., eight-color display with 720- by 512-user-addressable points, while the 3270-PC/GX provides a 19-in., 16-color diplay with 960- by 1,000-user-addressable points.

The GX model offers higher performance and more advanced graphics functions, IBM said, including the ability to create and rotate three-dimensional pictures at the workstation.

Windowing capability

The workstations offer the same windowing capabilities as the 3270-PC and connect to any IBM 370 through a 3274 controller. According to IBM, they can support four sessions in 3274 configurations operating in distributed function terminal mode.

The cost of a minimum 3270-PC/G configuration, including a system unit with 384K bytes of random-access memory, color display, display attachment unit, keyboard and graphics control program, is $9,535. The starting price for the 3270-PC/GX with color display, system unit, display attachment unit and control program is $16,785.

Both systems will be available in the fourth quarter through IBM National Accounts and National Marketing divisions.

IBM said it would be cost-prohibitive for existing 3270-PCs to be upgraded to the new graphics workstations.

IBM's 3270-PC/G and 3270-PC/GX

IBM last week also announced an enhanced release of its host graphics program, the Graphical Data Display Manager (GDDM), which it said produces three-dimensional charts and offers improved picture interchange between GDDM picture libraries and workstation files.

The release supports both the new graphics workstations and existing 3270 terminals.

Enhanced graphics prices

GDDM Release 4, available in the fourth quarter, carries an initial license charge of $715 and a $149 per month charge. The presentation graphics feature has an initial cost of $715 and monthly fee of $151. GDDM's interactive map definition feature has an initial price of $650 and a monthly charge of $200.

The new workstations are offered with a Graphics Control Program (GCP), an extended version of the 3270-PC control program which adds graphics capability on four host sessions and the 3270-PC session, the company said.

GCP also offers an alternative programming interface, the Graphics Procedure Interface, for PC-DOS 2.1 applications to provide access to graphics functions.

GCP will be offered in the fourth quarter for a one-time license fee of $450.

Mouse, tablet, printer

The IBM 5277 optical mouse introduced last week features three user-programmable buttons and will cost $340.

IBM also is offering the 5083 tablet Model 2 for higher resolution cursor positioning; it features four user-programmable buttons. This tablet can be used with a stylus or handheld cross-hair device; the first version costs $750 and the second, $900. Both accept input from the $295 IBM 5371 keyboard.

IBM's 3852 ink-jet printer produces color graphics, text and images on paper and transparencies, the company said. It prints up to 3,100 picture elements, or 37 char./sec, taking between 3- and 6 min/page for color graphics. The printer is available now for $900.

More information about last week's announcements is available from IBM's Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.

Compaq adds four desktop micros to its IBM-compatible offerings

By Paul Korzeniowski
CW Staff

NEW YORK — Hoping that the race of IBM Personal Computer compatibles goes to the swiftest machine, Compaq Computer Corp. last week introduced four desktop microcomputers built around Intel Corp.'s 8086 microprocessor operating at 8 MHz.

Compaq claimed its Deskpro line can run all Microsoft, Inc. MS-DOS software programs and hardware peripherals two to three times faster than the Intel 8088-based IBM Personal Computer.

Compaq's Deskpro

The Deskpro line consists of the following models:

- Model 1, including dual-mode monitor; Microsoft's MS-DOS 2.11 operating system; 128K bytes of random-access memory (RAM); one 360K-byte disk drive; six expansion slots and interfaces to parallel printers; red-green-blue color video monitor and composite video monitor; and radio frequency modulator.

This machine costs $2,495, according to Compaq.

- Model 2, offering all the features of Model 1 combined with 256K bytes of RAM and two 360K-byte floppy disk drives.

The Model 2 is priced at $2,995, Compaq said.

- Model 3, featuring dual-mode monitor; 256K bytes of RAM; four expansion slots; one 360K-byte floppy disk drive; a 10M-byte hard disk drive; an asynchronous communications and clock board; and the parallel interfaces found on Model 1.

It sells for $4,995, according to Compaq.

- Model 4, including the same features as the Model 3 along with 640K bytes of RAM and a 10M-byte fixed disk drive backup. The Model 4 is the first Compaq machine to incorporate 256K-byte upgrades, which reportedly free one expansion slot and can be added to the main system board of all other Compaq microcomputers. Model 4 is priced at $7,195. All models are currently being shipped, and a user can upgrade from any model to any other model, according to the vendor.

Dual-mode monitor

The dual-mode monitor feature, which is also available on Compaq's portable computers, includes a graphics card with a resolution of 640 by 200 pixels in text mode, 320 by 200 pixels in medium graphics mode and 640 by 400 pixels in high resolution mode and allows the user to switch from text to graphics programs without requiring the use of an expansion slot.

Two types of monitors are available — amber or green.

Additional information is available from Compaq, which is located at 20333 FM149, Houston, Texas 77070.

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on an average day at about 6 o'clock, so I guess it's a 10-hour day. And days where we have policy committee meetings, those days are half or full days in the committee, dealing with issues that come before it or dealing with primarily marketing or service considerations.

In the last couple of days, I've spent some time with our Federal Systems Division on an important procurement they're working with that is a national security activity. I spent time with our people in the National Distribution Division, going through some of their marketing strategies and the results they're enjoying. I've spent a lot of time in the activities in our service business. In that case, it's primarily here in the U.S. because we're going through some major changes in terms of resource deployment and service as the quality of our products continues to improve.

Q What do you count as your greatest professional disappointments and achievements?

I don't remember any great professional disappointments. I have taken every job that the business has been nice enough to give me, with a little fear and trepidation. I've tried to learn it and to run as fast as I can so that I at least stay even with the challenges, and when I've gotten to the point where I think I know what I'm doing, I usually am asked if I'd like another job [pause] and the thing starts all over again.

I mean, I can remember sales successes as a salesman, and I can remember the excitement of managing people for the first time. I can remember the excitement of my first national job, where I had a responsibility for the distribution of media industries. All of a sudden I had the U.S. market as an opportunity, and that was exciting.

I remember being the president of the Data Processing Division with 20,000 people and trying to conduct yourself in a way that people said, "Gosh, he's the kind of guy that ought to be there." I can remember going through the debates in the late '70s about the flexibility we talked about in IBM and going from a one-price house to terms and conditions that are a lot more flexible, going from a business that sold all our stuff ourselves to dealers and so forth. I participated in all that, and it was great fun.

So I can't point to one thing that particularly stands out. IBM is 370,000 people around the world. They're a fabulous bunch of people and — it's a vast overstatement — but we get up every morning, pretty early, and come to work and work hard, and we have fun at it. We like each other, by and large; we enjoy working with each other; and the business and we have prospered, and it seems to me you should work very hard to make sure that continues.

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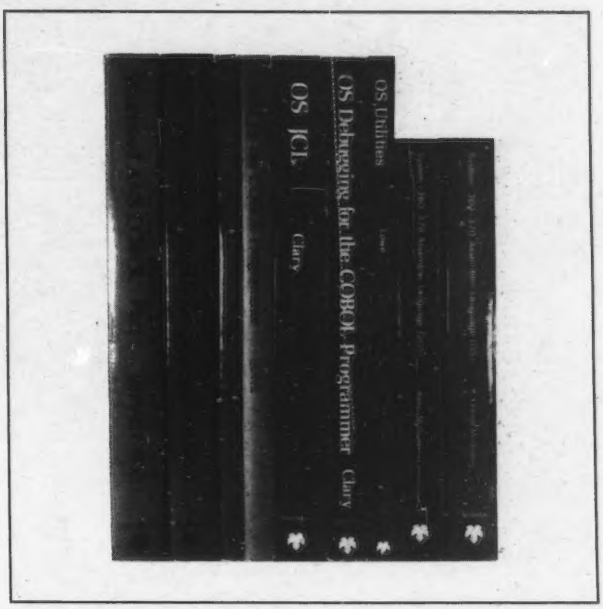

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NEWS

DG offers specialized MV/4000s, software, peripherals

By John Desmond
CW Staff

NEW YORK — Data General Corp. last week announced three specialized systems based on its 32-bit MV/4000 superminicomputer. At the same time, the firm announced a series of software and peripheral enhancements designed mainly for the MV/4000-based products.

Highlights of the DG products announced at a press conference here include:

- Two MV/4000-based workstations, the Distributed System (DS)/4000 and DS/4200. The monochrome DS/4000 and the color DS/4200 workstations were designed for computational and graphics applications.
- A specialized configuration of the MV/4000 that supports up to eight users for office automation and graphics applications. The MV/4000 Small Cluster (SC) system reportedly occupies about the same space as a two-drawer file cabinet.
- DG/UX, a native Unix operating system based on the University of California at Berkeley engineering protocol. The operating system can be used on existing MV/4000 series processors, as well as the newly announced DS/4000 and DS/4200 workstations.

DG/UX is the first native, or stand-alone, version of the operating system supported by DG, a spokeswoman said. It costs $1,500 for a stand-alone license. An eight-user license costs $3,500, a 16-user license costs $6,000 and a 32-user license costs $8,500.

- Support for the Berkeley Transmission Control Protocol/Internet Protocol (TCP/IP), a standard communications protocol that permits the newly announced DS family workstations and MV/4000 SC systems running DG/UX to coexist in local-area networks with DG equipment. TCP/IP costs $2,000 for an initial license and $1,500 for subsequent licenses. For users who purchase a DS/4000 workstation with DG/UX, the subsequent usage license is not required, the spokeswoman said.
- Quickplan, project planning software for users of DG's Comprehensive Electronic Office (CEO) office automation software. Quickplan is said to help engineers manage and control project time, costs and resources. An initial license costs $7,000, and subsequent licenses cost $5,600 each. It will be available in the early fall, DG said.
- A high-end, 592M-byte Winchester disk drive for the MV/4000 and larger MV/8000-C and MV/10000 superminis. Available in three packaged disk subsystems, the unit can also be used with the firm's older M/600, C/350, S/280, S/250 and S/140 systems equipped with a burst multiplexer channel.

The disk drive is supported by DG's AOS/VS, AOS/RT32, AOS and Rdos operating systems. The Model 6239 disk subsystem offers 592M bytes of storage and costs $38,000. A two-drive subsystem, the Model 6240, offers 1.17G bytes of storage for $65,000, and the three-drive Model 6290 subsystem, which costs $96,000, offers 1.18G bytes of storage.

- The Model 6300 magnetic tape subsystem, which uses an Ansi-standard 1,600/6,250 bit/in. format with a tape speed of 50 in./sec. The subsystem is supported by AOS/VS and AOS/RT32 and costs $32,690. The drive can serve as a primary backup device for large disk configurations.

Data General's MV/4000 SC is positioned between the vendor's Desktop Generation microcomputers and the Eclipse MV/4000. It runs under the AOS/VS and DG/UX. In the Unix configuration, the MV/4000 SC can support up to eight users and is said to be compatible with Unix System V and Berkeley Unix 4.1.

The MV/4000 SC is available in main memory configurations of 1M, 2M and 4M bytes and has a local mass storage capacity of 78.6M bytes. Built-in Ethernet IEEE 802.3 support allows users to communicate with other 16- and 32-bit DG systems as well as with non-DG systems.

The system ranges in price from $35,000 to $59,500. An MV/4000 SC with 1M byte of main memory, a 15M-byte tape cartridge, floppy disk, a DG/UX license and three software entitlements costs $34,800.

The system is available 90 days after receipt of order, the firm said.

DS family first

The DS family of workstations is said to be the first to use 64K-byte TMS4161 video dynamic random-access memory components supplied by Texas Instruments, Inc.

The DS/4000, with an integrated 1,024- by 1,024-pixel graphics display, 1M byte of main memory, a 38M-byte disk drive, a 768K-byte floppy disk backup unit, operating system, local-area network communications software and languages costs $35,500. A similarly configured color DS/4200 costs $44,500.

The 592M-byte Winchester-type disk subsystem announced last week uses a Micro-Eclipse CPU and a single-board controller that is said to give the unit a 2.2M byte/sec transfer rate and the ability to carry up to four 592M-byte disk drives.

More information is available from DG at 4400 Computer Drive, Westboro, Mass. 01580.

How many of America's major automakers

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Competition stiffening in global communications mart

THE CHANGING WORLD OF INTERNATIONAL COMMUNICATIONS

By John Dix
and Susan Blakeney
CW Staff

Part 2 of a three-part series.

Competition in international communications services has stiffened in the last few years, and it is likely to get stiffer yet.

For one thing, the traditional international record carriers (IRC), which offer telex-type message services and a variety of leased-line voice/data services, have had to contend with the entrance to the market of Western Union, Inc., a giant in the domestic industry.

But Western Union does not pose the only competitive threat to the traditional IRCs. Overseas communications has become a gleam in the eye of start-up companies like International Record Carrier, Inc. and Orion Satellite. And more established domestic carriers have put increased emphasis on this market.

International Record Carrier, its name an obvious play on the breed of carriers with which it competes, is a young company based in New York that boasts it can save users 20% to 50% over IRC services, depending on the ultimate destination of the traffic carried. It has installed switching centers in London, Hong Kong and Israel that can be accessed by its customers in the U.S. either by using the GTE Telenet Communications Corp. network or by dialing up directly over the international direct-dialing network.

"By bypassing the IRCs in the U.S. and by refiling the traffic out of the UK and/or Hong Kong or Israel, we can pass savings on to the user," said Joseph T. O'Brien, the company's acting general manager.

The service is cheaper, O'Brien said, because the rates of British Telecom, the national communications company in the UK, "are appreciably lower than anybody else's in the world."

Competition for IRCs

Competing to some degree with the packet services offered by some IRCs is GTE Telenet, the oldest of the U.S. packet-switching carriers, which offers international services in its own right. Jerry Shipley, director of international service and applications development for GTE Telenet, said the company provides direct connections for its packet-switching network to the UK, Canada, Australia, Chile, Mexico, Puerto Rico, the Dominican Republic, Trinidad and Argentina. By connecting through IRCs, GTE Telenet serves a total of 50 countries.

"Many countries have not yet established . . . a significant network to carry traffic within their country," Shipley said. "The services we can offer overseas depend on what service [other countries] already offer."

GTE Telenet transfers data packets only and is not a telex carrier, although users can use the service in that capacity if they want. A number of other carriers are offering or plan to offer international digital services that can be used to carry many types of communications traffic.

Satellite Business Systems (SBS) presently offers international services to London and is in the process of "defining the service" and working out operating arrangements with Italy, the Netherlands and Hong Kong. It offers two types of service: leased-digital-channel circuits, operating at speeds ranging from 2,400 to 1.54M bit/sec; and short-duration — as brief as an hour — circuit leases at either 56K or 1.54M bit/sec.

SBS offers these services via the Intelsat communications satellite system. Intelsat is an international consortium that operates a global satellite system and provides international services around the world. SBS, along with a number of other domestic common carriers, provides international services over the Intelsat system through contracts with Communications Satellite Co. (Comsat), the U.S. signatory of Intelsat.

In May, the Federal Communications Commission approved tariffs for a service that would allow Comsat to provide services directly to end users instead of through carriers, as it traditionally has done. Comsat's all-digital service can be used in a point-to-point or point-to-multipoint configuration from the U.S. to the UK, West Germany, Italy, the Netherlands, Denmark, Sweden and Canada. Speeds supported include 64K, 128K and 256K bit/sec and 1.54M and 2.048M bit/sec.

While Comsat's service still uses the Intelsat satellite system, other carriers have proposed the construction of private satellite services that would bypass Intelsat. One of the first to propose such a trans-Atlantic satellite system was Orion Satellite, an 18-month-old start-up. Orion's plans call for it to launch two satellites and to sell the transponder capacity to large multinational organizations.

The system has raised a number of international policy questions in regard to "how it fits in vis-a-vis the Intelsat agreement and the U.S. being

See GLOBAL page 12

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MOTOROLA / Four-Phase Systems

Users challenge impending CPE lease price hikes

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T is scheduled to begin charging higher rates this week for its leased terminal equipment. But if the International Communications Association (ICA) has its way, users will not have to pay the increase.

The ICA is a users group whose members include most of the nation's Fortune 500 companies. In a complaint submitted to the Federal Communications Commission earlier this month, the group claimed that the latest increase imposed by AT&T Information Systems, Inc., the AT&T subsidiary that markets deregulated products and services, violates an FCC decision issued last December.

That decision, in a proceeding generally referred to as Docket 81-893, allows AT&T to raise its lease prices for already installed terminals, also known as customer premises equipment (CPE), but only after offering this equipment for sale.

The question of whether such an offer was made Jan. 1 is at the heart of the present dispute. Also involved are "hundreds of millions of dollars," according to Brian Moir, the ICA's attorney. That is his rough estimate of the extra amount users will pay if the July 1 increase is not rolled back.

Spokesmen for AT&T and the FCC said they could not estimate how much is involved.

The Jan. 1 date is critical because the Docket 81-893 decision actually established two lease programs — one for CPE offered for sale on that date and the other for products offered for sale subsequently.

Regarding CPE not offered for sale on Jan. 1, the decision gave users two years to decide whether to buy their installed equipment. The two-year period begins when the equipment is offered for sale. AT&T is allowed to raise its lease rates during this period, but the increases must be in three equally spaced installments, the first of which has to be eight months after the two-year sales period begins.

As for terminals offered for sale on Jan. 1, the FCC adopted the terms of an earlier AT&T decision. Under that proposal, lease prices for embedded CPE could be raised on Jan. 1 and at six-month intervals after that.

AT&T insists that a letter sent to its CPE customers last December was the sales offer required by the commission's decision. The letter told customers that their terminals would be available for purchase beginning Jan. 1, 1984.

The ICA, however, argues that the letter did not constitute a bona fide offer. In a Jan. 13 comment to the FCC, the users group contended that "a letter to CPE customers notifying them of their right to purchase would not constitute an offer unless it contained sales quotes and the terms and conditions of sale. . . . At a minimum, any notice would have to provide the customer with immediate access . . . to firm sales prices and the related terms and conditions of sale."

Most customers still do not have this information, the ICA added. It said AT&T Information Systems admitted in a May 15 letter to the commission that "only 10% of embedded CPE users have received sales quotes thus far, that [Information Systems] did not even begin to have sales information available until Feb. 1 at the earliest [and] that [AT&T Information Systems] has found it necessary to establish (in March 1984) special teams to speed up the furnishing of sales quotes to users."

Last week, the commission was waiting for a final comment from the ICA. After it is received, said John Cimko, deputy chief of policy/program planning in the FCC's Common Carrier Bureau, final action will be taken. Cimko, one of those who will decide what is to be done, said that if a decision is delayed until after July 1, when the higher rates are scheduled to go into effect, the commission's freedom of action will not be reduced. If the increase is found to be illegal, he explained, the FCC can order refunds or take any of several other actions that would cancel the new charges.

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a signatory to that agreement," said Ron Fried, director of government affairs at Orion.

The executive branch of the federal government has reviewed Orion's proposal and, according to Fried, found that it would not pose a threat to Intelsat.

The proposal now needs the president's signature and the approval of the FCC.

According to Fried, an important consideration in Orion's proposal — and the primary reason why it would not be considered a threat to Intelsat — is that the system is intended for private networking.

Three other carriers have proposed similar systems — International Satellite, Inc.; New York-based RCA Global Communications, Inc.; and Cygness Satellite Corp.

While these systems would not compete directly with the IRCs, they could be used to carry any form of international communications.

Systems like Orion's, for example, could provide a large multinational company with all of its data and voice needs.

Computer, engine glitches postpone 'Discovery' launch

By Edward Warner
CW Staff

HOUSTON — With smoke billowing from one of its engines as it sat on the launchpad, the space shuttle *Discovery*, only four seconds from liftoff, had its first mission aborted last Tuesday when an on-board computer uncovered a problem with a fuel flow valve in one of the spacecraft's other three engines.

The National Aeronautics and Space Administration postponed the launch indefinitely after the computer automatically shut down the shuttle's engines. Its booster rocket never ignited.

Ironically, one of the same group of five on-board computers had caused the first postponement of *Discovery's* launch, set for the day before. That computer, used as a backup in case any of the spacecraft's other four identical IBM AP101 computers should fail, had developed a faulty memory page in its I/O processor, IBM spokesman Joe Militano reported.

The faulty computer was replaced within hours by an identical model taken from the shuttle *Challenger*, but the flight was moved up by one day.

Only two of the on-board general-purpose computers are needed to fly the spacecraft while in orbit, but four are needed during the shuttle's takeoff and reentry.

"Obviously, bringing it through the atmosphere is critical," Militano said. "At that point, all four [computers] operate identically to one another; they're identical computers running with the same software, and they're doing the same thing."

Should one of the four computers fail at that point, Militano said, *Discovery's* pilot would then have the option of putting the backup computer to use. Though this backup is physically identical to the others, it differs in that its software is provided by Rockwell International Corp., not IBM, a safeguard against programming errors.

Militano stressed that it requires "a human decision to engage the fifth [computer]" because, were the backup to engage automatically, a fault in it could take control of the other four computers and override them.

The backup computer has been turned on and off during every ascent and descent, but, Militano noted, "it has never been engaged." The shuttle's computer system is "built with the concept that computers do fail. As we know in the computer business, you do get a glitch. You build in all this redundancy to get overwhelming odds in your favor that these things could not happen simultaneously," he maintained.

Militano said the 32-bit AP101 computer is built to military specifications, weighs 55 lb and is roughly the size of a bread box — 8 by 10 by 20 in. Its cycle time is 800 nsec, and its internal storage capacity is approximately 425K bytes. Much of the computer's software is stored in a tape drive in the spacecraft's avionics bay.

"An incredible amount of programming" goes into the software for each flight, Militano said. After each mission, the programmers "have to turn around a whole set of new programming material, although there is some that is maintained from flight to flight."

IRS computer error cancels tax-exempt rank

WASHINGTON, D.C. — The Internal Revenue Service is trying to diagnose the "computer error" that prompted the IRS to send letters to certain churches and small charities, incorrectly stating that their tax-exempt status would be terminated, a spokesman for the IRS said last week.

Steve Pyrek, the IRS spokesman here, said he could provide no details about the episode because the agency is still trying to sort out what happened. However, the IRS has begun sending out correction letters to recipients of the termination letters, he said.

The spokesman pointed out that the IRS regularly purges its master list of tax-exempt groups to remove defunct and ineligible organizations, but that last month some organizations were erroneously stricken from that master list.

Termination status

More than 150,000 organizations are in "termination status," and the IRS does not know how many of these organizations were correctly or incorrectly sent termination letters, Pyrek said.

The computer error arose, Pyrek explained, because the computer terminates organizations that fail to file a Form 990 certifying their tax-exempt status, but certain churches and small charities (under $25,000 in assets) are exempt from filing the form.

According to Pyrek, these exempt organizations should not have received the termination letters.

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NEWS

PRODUCT SPOTLIGHT

LINK from page 1

Crocker's view, outlined during a session on micro-mainframe links at Chicago's recent Information Management Exposition & Conference for Software, was echoed by Bernard Mathaisel, principal with the management consulting firm of Temple, Barker & Sloane, Inc. "Users are generally disappointed when they finally see these products, most of which are announced before they are even through beta test. The users expect to see certain capabilities that exist only in a laboratory environment. The current links are not all they are cracked up to be."

The micro-mainframe links presently available, according to Crocker, fall into four general classes.

- Links offering terminal emulation capabilities make the micro appear essentially as a dumb terminal extension to the mainframe.
- Micro-mainframe packages with simple file transfer ability allow for the capture of mainframe screen data, which can then be saved and manipulated on the micro.
- More sophisticated links offer selective data extraction capabilities, often through the use of a fourth-generation programming language, to allow for downloading of summary or totaled information from the host.
- The most advanced packages allow for bidirectional data transfer, giving users both download and upload capabilities. Some products in this category provide for real-time updating of production data bases on the mainframe, while others allow only simple uploading to a buffer or batch data "store."

Across the categories, products can be segmented further into those with open and proprietary architectures, Crocker said. Open architecture links purport to offer micro access to a variety of mainframe data base management systems (DBMS) and file structures and offer downloading, often with automatic reformatting, into a number of micro data formats.

Packages built on a proprietary architecture, a strategy adopted by many of the established large-systems software houses to maintain or enlarge their existing user bases, usually provide access only to data residing in a particular vendor's mainframe software. The products generally allow for downloading directly into the company's micro software or into a limited number of popular micro packages, such as Visicorp's Visi Calc and Lotus Development Corp.'s 1-2-3 spreadsheets or Ashton-Tate's Dbase II DBMS.

While a truly functional open or universal link is surely the Holy Grail as far as end users are concerned, analysts acknowledge that it is several years away technologically. In the interim, users and DP departments are faced with the difficult task of determining which of the product types best fits their individual and organizational needs (see story on page 16).

"A really open link is very difficult to deliver," said Kenneth Bosomworth, president of International Resource Development, Inc. "You can only utilize the micro's intelligence if you have a link that really understands how the mainframe system operates. An open link has to incorporate a variety of technologically complex access methods for vendor-specific DBMS, and it becomes very unwieldy and complex at both ends. The vendors advertising those links usually have to stay with simple terminal emulation to make them work."

Bosomworth's outlook is not shared by everyone, however. According to Hugh Carroll, open link products offer greater organizational and individual flexibility. Carroll is president of Infocenter Software, Inc., a firm that markets the Ilink micro-mainframe package.

"The DP director wants to have some kind of link installed that doesn't cement him into specific software at either end," he said. "You shouldn't have to tie the link into existing mainframe software that may one day be outgrown or replaced. Users should be able to choose data from any source and move it to any program they want to use."

The prospective link user must also choose between the more-or-less costly and complex communications methods that are used to complete the link physically — among them asynchronous communications; protocol conversion; and terminal, controller and remote job entry emulation. The cost of coaxial connection cards or other communications hardware for a number of micros will add to the already high cost of many link products, considering the required

Major independent software vendors offering micro-to-mainframe links

Vendor	Mainframe Environment	Micro Environment	Communications	Real-Time Data Upload, Download	Mainframe Data Base(s) File Structure(s) Accessed
Applied Data Research, Inc. *ADR/PC Datacom*	IBM 370, 30, 4300 Series; OS or DOS; ADR/Datacom/DB; ADR/Dataquery; ADR/Datadictionary	IBM Personal Computer, XT; PC/DOS 2.0; 128K bytes minimum	Asynchronous, Bisynchronous, SNA/SDLC	Data Download; Upload of Queries only	ADR/Datacom/DB
Cincom Systems, Inc. *PC Contact*	IBM 370 and larger; VM, OS or DOS; CICS or Environ/1 Mantis	IBM Personal Computer, XT; PC/DOS 2.0 128K bytes minimum	Asynchronous, SNA/SDLC, Bisynchronous	Yes	Total, TIS, DL/1, Vsam, Mantis
Computer Associates International, Inc. *CA-Link*	IBM 370, 30, 4300 Series; VM, OS or DOS; CA-Universe (Recommended)	IBM Personal Computer, XT; PC/DOS 2.0; 256K bytes minimum Hard Disk	Asynchronous, Bisynchronous SNA/SDLC	Yes	CA-Universe, Vsam
Computer Corp. of America *PC/204*	IBM 4.300 and larger; VM, OS or DOS; Model 204	IBM Personal Computer, XT; PC/DOS 2.0; 256K bytes minimum	Asynchronous	Data Download; Upload of Procedures and Programs only	Model 204
Outlook Software, Inc. *Information Database*	IBM 4300 and larger; VM, OS or DOS; IDMS-DC; IDMS/R, IMS or DL/1	IBM Personal Computer, XT; PC/DOS 2.0; 256K bytes minimum; IBM Color Graphics Card	Asynchronous, Bisynchronous	Yes	IDMS/R, IMS, DL/1
Informatics General Corp./Ashton-Tate *Dbase/Answer*	IBM 4300 and larger; OS or DOS; CICS or IMS/DC; Answer/DB	IBM Personal Computer, XT; PC/DOS 2.0; 256K bytes minimum	Asynchronous, Bisynchronous	Yes	Most standard DBMS and sequential files
Informatics General Corp./Visicorp *Visi Answer*	IBM 4300 and larger; OS or DOS; CICS or IMS/DC; Answer/DB	IBM Personal Computer, XT; PC/DOS 2.0; 256K bytes minimum	Asynchronous, Bisynchronous	Yes	Most standard DBMS and sequential files
Information Builders, Inc. *PC/Focus*	IBM 4300 and larger; VM/CMS or MVS/TSO; Focus	IBM Personal Computer, XT; Texas Instruments, Inc. Professional; Wang Laboratories, Inc. Professional; PC/DOS 2.0, Hard Disk; 512K bytes minimum	Asynchronous, Bisynchronous, SNA/SDLC	Yes	Focus, Qsam, Vsam, Isam, IMS, IDMS/R, Adabas, Total, Model 204, System 2000
Management Science America, Inc. *Reachlink*	IBM 370, 30, 4300 Series; VM, OS or DOS; CISC; MSA Mainframe application(s)	IBM Personal Computer, XT; PC/DOS 2.0; 128K bytes minimum	Asynchronous, Bisynchronous, SNA/SDLC	Yes	MSA Mainframe applications
Mathematica Products Group, Inc. *Ramlink*	IBM 370, 30, 4300 Series; VM, OS or DOS; Ramis II	IBM Personal Computer, XT; PC/DOS 2.0; 256K bytes minimum	Asynchronous, Bisynchronous	Yes	Ramis II, IMS, DL/1, IDMS/R, Total, Adabas, sequential files
McDonnell & Dodge Corp. *Interactive PC Link*	IBM 370, 30, 4300 Series; OS or DOS; CICS; Millennium	IBM Personal Computer, XT; TI Professional; PC/DOS 2.0; 256K bytes minimum	Asynchronous, Bisynchronous, SNA/SDLC	Yes	Millennium, Vsam
On-Line Software International, Inc. *Omnilink*	IBM 370, 30, 4300 Series; OS or DOS; CICS; Omnicom (Recommended)	IBM Personal Computer, XT; PC/DOS 2.0; 256K bytes minimum	Asynchronous, Bisynchronous, SNA/SDLC	Yes	All IBM file structures
Software AG of North America, Inc. *Natural/Connection*	IBM 370, 30, 4300 Series; VM, OS or DOS; Vsam or Adabas; Natural	IBM Personal Computer, XT; PC/DOS 2.0; Microsoft, Inc.'s MS-DOS; 192K bytes minimum	Asynchronous Synchronous	Yes	Natural, Vsam, Adabas
Software International Corp. *Smartlink*	IBM 360/370, 30, 4300 Series; VM, OS or DOS; CICS; On-Line General Ledger and Financial Reporting	IBM Personal Computer, XT; PC/DOS 2.0; 256K bytes minimum	SNA/SDLC, Synchronous	Yes	On-Line General Ledger and Financial Reporting

CW CHART

Selected independent vendors offering micro-to-mainframe links

Vendor	Mainframe Environment	Micro Environment	Communications	Real-Time Data-Upload, Download	Mainframe Data Base(s)/ File Structure(s) Accessed
First Concept Technologies, Inc. *Interchange/I*	IBM 370, 30, 4300 Series; VM, OS or DOS; CICS; Adabas, IDMS/R, TIS or Total	IBM Personal Computer, XT; Wang Laboratories, Inc. Professional; Apple Computer, Inc. models (not including Lisa and Macintosh); PC/DOS 2.0	Asynchronous, Bisynchronous, SNA/SDLC	Yes	Vsam, Adabas, IDMS/R, TIS and Total
Infocenter Software, Inc. *Ilink*	IBM 370, 30, 4300 Series; VM/CMS	IBM Personal Computer, XT; Microsoft, Inc.'s MS-DOS or PC/DOS 2.0; 128K bytes minimum	Asynchronous, Bisynchronous, SNA/SDLC	No	SAS, Ramis, Focus, ADRS, APLDI and FPS
Micro Tempus, Inc. *Tempus-Link*	IBM 370, 30, 4300 Series; VM, OS or DOS; CICS, CMS or TSO	IBM Personal Computer, XT; Digital Equipment Corp. Rainbow; MS-DOS or PC/DOS 2.0	Asynchronous, Bisynchronous	Yes	Sequential Files, IDMS/R, IMS, DL/1, Rapid, Total, Adabas, Model 204, System 2000
Oxford Software Corp. *PCmainframe*	IBM 370, 30, 4300 Series; DOS/VSE or OS; CICS	IBM Personal Computer, XT; PC/DOS 2.0; 128K bytes minimum	Asynchronous, Bisynchronous	Yes	Vsam
VM Personal Computing, Inc. *Please*	IBM 370, 30, 4300 Series; VM/CMS	IBM Personal Computer, XT; Wang Professional; PC/DOS 2.0; Relay Communications Package; 128K bytes minimum	Asynchronous	Yes	VM/CMS-based files

CW CHART

Information contained in the charts on these pages was obtained from product literature and vendor responses to a preformatted product questionnaire. These charts are designed to illustrate a sampling of the micro-to-mainframe link technologies available. They are not intended as an exhaustive summary of the vast number of link products currently offered.

Major independent software vendors offering micro-to-mainframe links

Vendor	Automatic Data Reformatting for	Recovery & Restart Facilities	Security Facilities Provided at	Price: Mainframe Portion	Price: Micro Portion	Additional Features
Applied Data Research, Inc. *ADR/PC Datacom*	DIF, CSV	Yes	Micro and Mainframe	$13,500 (OS) $12,500 (DOS)	$495	ADR/Signon establishes user access to micro and mainframe applications.
Cincom Systems, Inc. *PC Contact*	DIF, Ascii, Series One Plus	Yes	Mainframe	$10,000 to $30,000	$1,000, includes Series One Plus	Allows for applications prototyping and development on micro through Mantis.
Computer Associates International, Inc. *CA-Link*	CA-Executive, CA-DBMS, Ascii, DIF, Binary Files, Basic	Yes	Micro and Mainframe	Combined: $1,295, minimum five micros		Window manager facility allows link to run in window while other micro applications in use.
Computer Corp. of America *PC/204*	DIF	Yes	Micro and Mainframe	Combined: $17,000 minimum 10 micros		Facilities provided for development of customized micro scripts and menus.
Cullinet Software, Inc. *Information Database*	Goldengate Series	Yes	Mainframe	$75,000 to $125,000	$1,295 with communications link	No knowledge of mainframe procedures necessary.
Informatics General Corp./Ashton-Tate *Dbase/Answer*	Dbase II, Friday!, Framework, Dbase III	Yes	Micro and Mainframe	$45,000	$500 to $795	User profiles allow DP to limit information access at four levels: Data Base, Segment, Field and Value.
Informatics General Corp./Visicorp *Visi Answer*	Visi Series	Yes	Micro and Mainframe	$45,000	$500 to $795	User profiles allow DP to limit information access at four levels: Data Base, Segment, Field and Value.
Information Builders, Inc. *PC/Focus*	DIF, Lotus 1-2-3, Report File	No	Mainframe	$43,000	$1,595	Identical to mainframe Focus in syntax and capabilities.
Management Science America, Inc. *Peachlink*	DIF, Peachtree Series, Visi Calc, Lotus 1-2-3, Dbase II	Yes	Micro and Mainframe	Combined: $4,000		Screen transfer capability provides for downloading of reports and screen information from non-MSA applications.
Mathematica Products Group, Inc. *Ramlink*	DIF, Comma Delimited, Keepit	Yes	Micro and Mainframe	$4,500 to $9,000	$185	Provides full 3270 emulation for asynchronous terminals and micros without additional hardware.
McCormack & Dodge Corp. *Interactive PC Link*	Ascii Text, Lotus 1-2-3	Yes	Mainframe	$25,000	$750 to $2,200	Provides live updates to production data base.
On-Line Software International *Omnilink*	DIF, Dbase II, Executrieve/PC, Aura Business Software	Yes	Mainframe	$35,000 (OS) $28,000 (DOS)	$1,200	Content Access Method (CAM) security system controls user access to information transparently.
Software AG of North America, Inc. *Natural/Connection*	Ascii, DIF, Basic, Multiplan	Yes	Mainframe	$15,000 (DOS/VSE) $20,000 (VM/CMS) $25,000 (MVS)	$1,000	Completely integrated with Natural fourth-generation information processing system on mainframe.
Software International Corp. *Smartlink*	DIF, Lotus 1-2-3, Visi Calc, Multiplan	Yes	Mainframe	$90,000 (OS)* $82,000 (DOS)*	$2,995	Includes help screens, prompts and error messages to facilitate use.

* General Ledger and Financial Reporting.

CW CHART

mainframe software investment and the link copy necessary for each micro.

In addition, Crocker warned, DP should consider carefully the added strain a micro-mainframe link will impose on the firm's existing telecommunications network before embracing the technology. And, according to Shaku Atre, president of Atre International Consultants, Inc., users should be aware of the limitations involved in data transfer between two diverse machine technologies.

"At 1,200 bit/sec, it can take an hour or more to download enough data to fill a 320K-byte floppy disk," Atre said. "That is a very long time, and it assumes there are no errors that require retransmission of the data. Extraction is not quick; it has to be planned for. You can download a few records on an impulse, but not the number of data base records you need for any serious micro processing."

According to Dr. John McQuillan, president of McQuillan Consulting, many of the products also pose a trade-off between functionality and ease of use. "The links that attempt to do a lot are usually only good for a computer audience or for DP departments. They require the user to be familiar with mainframe software terminology. The ones that insulate the user from that don't seem to provide much functionality. Maybe I'm a dreamer, but I think the magic of the micro-mainframe link is the chance to multiply the audience accessing mainframe data without mainframe knowledge."

In the future, said James Dickie, Answer Series market manager for Informatics General Corp., that problem will be addressed through better

See LINK page 16

Selected independent vendors offering micro-to-mainframe links

Vendor	Automatic Data Reformatting for	Recovery & Restart Facilities	Security Facilities Provided at	Price: Mainframe Portion	Price: Micro Portion	Additional Features
First Concept Technologies, Inc. *Interchange/1*	DIF, MS-DOS, UCSD P-System	No	Mainframe	$45,000 per mainframe and one DBMS	Mainframe price includes unlimited number of micro copies	Security facilities allow DBA to create templates defining micro user access to mainframe data.
Infocenter Software, Inc. *iLink*	CSV, DIF	No	Mainframe	$5,000 plus $2,000 per DBMS access "Bridge"	$450	Information Interchange Format (IIF) allows for data cross-loading between mainframe data base products.
Micro Tempus, Inc. *Tempus-Link*	DIF	No	Mainframe	$6,175, provides access to five concurrent PC users	Included in mainframe pricing	Product can run in native mode or can be embedded into in-house or OEM package.
Oxford Software Corp. *PCmainframe*	Basic, DIF, Fixed format, binary	Yes	Micro and Mainframe	$8,500 (DOS) $12,500 (OS)	Mainframe price includes eight micro copies	Provides extensive mainframe data selection and summarization facilities.
Vitt Personal Computing, Inc. *Please*	N/A	Yes	Mainframe	$2,500	$149	Product emulates user ID, edit, form link and access other mainframe packages during micro-mainframe file exchange.

CW CHART

Security issue seen blocking links' adoption

In Philip Dorn's view, security is the major factor hindering the adoption of microcomputer-to-mainframe link technology within large corporations.

"People are moving very carefully in this area," said Dorn, president of Dorn Computer Consultants, Inc. "Downloading of data is fine, but I'm scared to death of uploading. It's a frightening security exposure, and I am not at all certain the link packages offer adequate protection. That is the main reason that major companies are moving so slowly in this area."

While Dorn is less concerned about downloading, others also view that capability as a potential security threat. "Financial data and other mainframe information should not be on diskettes, even if the micro user is authorized to access that data. I have seen no viable system for protecting data on a diskette. It comes down to opening up your mainframe to anyone," said Shaku Atre, president of Atre International Consultants, Inc.

Market acceptance imperative

Software industry executives and analysts interviewed by *Computerworld* sparred on the relative merits of the data protection systems offered by the current micro-mainframe links. But all agreed that the availability of comprehensive security facilities is critical to wider market acceptance of the products.

While a limited number of link packages offer sophisticated security facilities at either or both the micro and mainframe, many products simply rely on the security inherent in the mainframe data base management system or application accessed by the link. And, as Atre complained, few firms have addressed the security dangers involved with mainframe data residing on a floppy disk, which can be easily lost or damaged.

Software houses clashing in the link market seem to have settled into two distinct camps on the issue of data uploading. Vendors offering real-time updating of mainframe production data bases claim to offer more functionality and flexibility. But those who allow uploading only to a buffer area — data that can later be incorporated into production data bases by DP — say they provide tighter security.

"Having users updating live data bases from their micros is a real concern," said Bernard Mathaisel, principal with the management consulting firm Temple, Barker & Sloane, Inc. "The shadow [buffer] data base is a temporary measure until we find better ways to handle micro access to live data."

PRODUCT SPOTLIGHT

Considerations for adopting micro-CPU links

Should you, as DP manager, be willing to invest in the microcomputer-to-mainframe links currently available? Or should you simply wait for something better to come along?

That depends on your organizational needs, according to David Ferris, chairman of Ferrin Corp., a personal computing support company. "Don't dismay if you don't see a real need for a micro-mainframe link. Bear in mind that the technology won't develop as quickly as you'd like — these things still have a long way to go. As they mature, the links will become part of your overall information resource, so keep abreast of what is happening. But don't rush headlong into the technology. Wait until a real user need develops."

Kenneth Bosomworth, president of International Resource Development, Inc., said the critical factor in any decision to implement a link is whether you really want to give end users access to corporate data.

"Most typically, the purpose of the link is to give a manager data access at his desk. The strategic decision is whether you want that manager tampering with that data. Purchasing the hardware or software to provide access poses no real problem. The issue is access, and that has to be decided at the corporate level," Bosomworth said.

According to Janice Antonellis, senior research analyst with International Data Corp., there are a variety of factors a DP manager should consider once the decision has been made to purchase a micro-mainframe link. Among the factors:

- Which users require access to mainframe data? Are there different classes of users who require different access capabilities?
- What security facilities will be necessary for your organization?
- Which mainframe data base management systems or applications do users need to access?
- Which micro software packages are your end users currently running?
- Does a particular link vendor have a "future strategy?" Will its product grow with your organization?

Shaku Atre, president of Atre International Consultants, Inc., advised DP managers to use a link on a pilot basis within an information-center-type environment. "Try the product on five or 10 micros and gain some expertise with the technology. Keep learning as the products mature. Within the information center, give qualified users the opportunity to use corporate data so they can become familiar with the link also."

Link troubles? Don't look to IBM for help

If you are waiting for IBM to solve your microcomputer-to-mainframe link problems, John Crocker said, you will probably be disappointed.

"Many people feel IBM will provide *the* answer, but I don't think it will. There has been no single micro-mainframe solution advanced by IBM, and that will continue for some time to come," said Crocker, executive vice-president of On-line Software International, Inc.

According to Crocker, whose remarks came during a session on micro-mainframe links at the recent Information Management Exposition & Conference on Software in Chicago, IBM's strategy thus far has been to provide for physical connectivity between its systems. "Right now, you can connect the [IBM Personal Computer] to just about any other device. [IBM has] successfully implemented a basic level of physical connectivity," he said.

In addition, he said, Big Blue is promoting its communications standards for data interchange through improvements to its Systems Network Architecture, Document Interchange Architecture, Document Content Architecture and Advanced Program-to-Program Communications.

Other analysts interviewed by *Computerworld* said IBM has already addressed the micro-mainframe link through the IBM 3270 Personal Computer [CW, June 25]. But Dr. John McQuillan, president of McQuillan Consulting, disagreed.

"The 3270-PC is said to be IBM's micro-mainframe link. It is really only a partial solution. It only gets you onto the mainframe as a terminal. What we really need is for the micro to be connected as a computer. But a lot of DP managers were waiting for IBM to move in this area, and I think the 3270-PC will be a successful product."

Micro-mainframe spending to double in 1984

An International Resource Development, Inc. (IRD) report released in December predicted that users would spend more than $500 million in 1984 on microcomputer-to-mainframe communications products [CW, Dec. 5].

In a recent interview with *Computerworld*, IRD President Kenneth Bosomworth said that the study is right on target so far. That means that companies will spend more than twice as much on micro-mainframe link products this year than they did in 1983, when U.S. corporations paid out some $220 million for that technology, according to the report from IRD.

"The market will grow even faster than what we've already seen," said Regis Kaufman, manager of product marketing for Software International Corp. "We've just begun to integrate all these personal computer [software] tools through links. People are beginning to realize that they can take their micros and these tools and couple them with the strength of corporate data through links to meet organizational goals. We're only now beginning to realize the potential of that market."

Standard product offering

As a result, Kaufman believes, the micro-mainframe link will become a standard product offering for most major software houses. "In the future, a link will be as important as the capability for on-line data entry. You will have to have a link in your portfolio, or users will start thinking you're not current in your technology."

Kaufman's point was echoed by Janice Antonellis, senior research analyst with International Data Corp. "Last year the link was a new product — now it's a necessary product, especially if the vendors' focus is to offer end users application development and data access tools. If their mainframe products are geared to that, they will have to address micros with some kind of link."

In addition, a number of industry watchers predicted a widening of micro-mainframe link offerings to include non-IBM equipment — perhaps even a micro-minicomputer-mainframe link.

"Other manufacturers, such as [Hewlett-Packard Co.] and [Wang Laboratories, Inc.], have a large installed base, and their users are asking for these same capabilities," Kaufman said.

"You will see a migration to them once vendors address the IBM audience. From our perspective, that's a real goal."

"As a software vendor, you can't be all things to all people," said James Dickie, Answer Series market manager for Informatics General Corp. "But you can be all things to all important people. We simply will have to address the other major players. The next evolution will definitely be the micro-mini-mainframe link."

Link seen changing fantasy of DDP into reality

The microcomputer-to-mainframe link will turn the dream of distributed data processing (DDP) into a reality in the very near future.

So said Shaku Atre, president of Atre International Consultants, Inc. "We have talked about DDP for the last decade, and we have yet to come up with a good definition. A true DDP system should provide a single system image to users. The minicomputer tried to do that, but the micro-mainframe link will succeed," Atre said.

The link that will bring DDP to fruition, according to Dr. John McQuillan, president of McQuillan Consulting, will have to take advantage of the intelligence and power of the micro. "Most links only view the micro as an [IBM] 3270 terminal. But it is a computer, and users shouldn't have to rely on 3270 technology to utilize the connection that can exist between machines."

Through the micro-mainframe link, David Ferris said, the micro will, in the future, be used as a front and back end to mainframe applications for such tasks as data entry and editing and local analysis. Ferris is chairman of Ferrin Corp., a personal computing support company.

"Micros will become intelligent workstations tied to other corporate resources, rather than simply stand-alone facilities," Ferris said.

LINK from page 15

end-user interfaces. "You will see products that give users the capability to specify easily and exactly the data they want. We're still asking them to think logically like a programmer. The software will then be intelligent enough to access that data, no matter where it resides. The link will be transparent to the user," Dickie said.

In addition, according to Janice Antonellis, senior research analyst for International Data Corp., a larger number of micro-mainframe link vendors will begin to offer real-time data base updating capabilities, rather than simply uploading. "At certain corporate levels, there is a real need for dynamic updating of mainframe data. But security (see story on page 15) is the issue, and the products will have to address that. Better security will also encourage wider use."

Atre, however, disagrees. "The vendors do not provide updating of mainframe data bases because DP management doesn't really want that to happen. The vendors are selling to DP, not to end users. There are a lot of data security and integrity issues at work here."

Greene has no apologies on 'inevitable' Bell breakup

Judge predicts telecommunications to be dominant U.S. industry

By David Myers
CW New York Bureau

NEW YORK — U.S. District Court Judge Harold H. Greene said he has no apologies for signing the August 1982 consent decree that broke up the Bell system, calling divestiture inevitable and in the long-term interests of AT&T, the telecommunications industry and the American public.

In a recent speech to an audience of telecommunications professionals here, Greene said that the confusion of overlapping bills and services caused by the breakup was a "temporary adjustment" and that AT&T's divestiture will result in telecommunications becoming the nation's dominant industry.

"Eventually the Bell monopoly would have collapsed" under the pressure of foreign competition and consumer product backwardness, Greene said. "If it [divestiture] hadn't happened in a lawsuit, it would have happened in some other way," he told the first fund raising dinner of the newly formed telecommunications division of the United Jewish Appeal (UJA).

The AT&T case, pressed through seven years of litigation and an 11-month trial, changed the life of the refugee from Nazi Germany appointed to the federal bench by President Carter. Although chosen as runner-up Man of the Year by *Time* magazine last December, Greene said the biggest change in his life has not been the sudden fame but "the work load that descended upon me and is still descending upon me."

Greene insisted, however, that he would not rule differently if he had the decision to make over again. "Everything is perfect," he said. When greeted by laughter, he amended his statement: "I think it [divestiture] is going to work out," he said.

Greene said the Bell breakup became inevitable on August 17, 1951, at the time of the first commercial application of microwave transmission in a coast-to-coast network. "Before then, wooden pole and copper wire technology made it impossible to have more than one phone company," he said, but after microwave technology emerged, "the demise of [the] AT&T [monopoly] was just a matter of time."

Greene

The nation had three alternatives to breaking up the Bell system, Greene said. Congress could have "crushed the newcomers" like MCI Communications Corp., "allowed AT&T to do that" or "removed the constraints against AT&T."

The U.S. antitrust tradition, described by Greene as a "deeply ingrained" repugnance "against cartels," made it impossible for a federal judge to lift the antitrust regulations constraining AT&T. In addition, Congress had refused repeatedly to exempt the telecommunications industry from antitrust legislation, and the case against Bell had been pursued by "several administrations," both Republican and Democrat, Greene said.

The other alternative, to permit interlopers like MCI to be crushed, would have eliminated competition, Greene said. And that "would have been detrimental to the future of the telecommunications industry," he declared.

Greene pointed to the emergence in the past year of automatic redial technology, cordless phones, cellular radio and call tracing as proof of the benefits from competition between AT&T and its rivals. "The consequences would have been disastrous" if foreign competition, primarily from Canada and Japan, had gotten the jump on U.S. companies in these product areas, Greene said.

"The marketplace is now international, and we cannot afford to let the American telecommunications business stand still," Greene said, describing divestiture as a spur to new product innovation.

Comparing the present-day telecommunications industry to what steel and coal were in pre-World War II America, Greene said the "reorganization of the industry" caused by AT&T's breakup "will contribute to a better performance" in the areas of social change and corporate profits as well as technological innovation.

"It will result in telecommunications becoming the nation's dominant industry," Greene said.

In a behind-the-scenes glimpse of the Bell case, Greene said he had demanded that the negotiated settlement between AT&T and the U.S. Justice Department be changed to give the local operating companies control over the Yellow Pages and the Bell name and patents.

"This was to ensure the viability of the local companies and to ensure low local [phone service] rates," the judge explained.

Greene said he had also insisted that AT&T be banned from electronic publishing and that the divested phone companies be permitted to enter the business of customer premise equipment (CPE). Greene disagreed, saying that if the divested companies "weren't allowed in that business, AT&T might have been so strong it might have acquired a substantial monopoly in that field." Greene said there was no basis for the fear that the divested companies would monopolize CPE. "The more competition the better," he said.

See GREENE page 18

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NEWS

Integration of E-Mail seen heightening its demand

By Edward Warner
CW Staff

CHICAGO — When a manager in the not-so-distant future wants data from the corporate information center, he will not have to call a worker there, relay the request — and wait. Rather he will be able to get the answer quickly by using his company's electronic mail system.

So claimed Susen Kay, a planner with AT&T Technologies, Inc. of Lisle, Ill., who spoke at the Office Information Systems Conference held here earlier this month.

Kay said electronic mail, or E-Mail, is catching on with firms seeking to speed their communications. Further, she said, the increasing integration of computers with E-Mail, as in the data retrieval example, will spur demand even more.

Kay's opinions were echoed by ITT-Dialcom, Inc. Central Region Manager Rick Savage, who shared the podium with Kay in a presentation on E-Mail. Savage quoted one recent study that pegged the number of existing E-Mail "mailboxes" in 1982 at 220,000, but projected that number to reach 3 million by 1987.

Integrated mail

One advance that will promote such growth, he said, is that "in the next two years all [electronic] mail systems will be integrated. Anyone with an electronic mailbox will be able to send and receive, regardless of who they bought from."

Savage also predicted that E-Mail's coming integration with computerized data bases will mean that an executive could, using a key word, establish a clipping service that routed to his E-Mail box all information about a subject, even as the information was added to the data base.

For the present, Kay said E-Mail users should expect their systems to at least provide registered mail, which tells them when their message was received, and on-screen forms to prompt users for information and security based on two sets of passwords — one for both the manager and his secretary and the other, which is used for high-security messages, for the manager alone.

A warning

Kay, however, warned potential E-Mail enthusiasts that "E-Mail doesn't change people's work habits."

If a person is reluctant to answer written letters, she said, it is not likely E-Mail will bring out a better response.

She added that E-Mail's potential for calendaring, under which an executive can arrange appointments with other executives in the system, is highly overrated.

Calendaring only seems to work to reserve office equipment and meeting rooms.

Kay did not see as significant the recent departure of the U.S. Postal Service's Electronic Computer-Originated Mail (Ecom) service, under which E-Mail users could once send electronic messages to one of 10 regional Ecom centers for conversion to hard copy and delivery.

Ecom, she said, "was nothing close" to E-Mail.

"There wasn't a service there. You had to do everything up front," Kay said.

Savage, whose company has been mentioned as a possible buyer of Ecom's assets, said several ITT-Dialcom clients have asked for such a service.

GREENE from page 17

The judge, who was introduced at the UJA dinner at the Grand Hyatt Hotel here as "the man responsible for the breakup of AT&T," also said he is "skeptical" of user access fees and of worries about bypass. Greene said the Federal Communications Commission told him during the trial that the user access fees question was not important.

"If they were not important a year-and-a-half ago, how did they become important now?" Greene asked. In any case, Greene said he is opposed to user access fees because "public policy favors universal service — a phone for everyone." When AT&T and other long-distance carriers object that without access fees they are subsidizing the local operating companies, Greene said he replies that "since 1933 and the New Deal, competition has coexisted with subsidies."

Greene, presented after his speech to the UJA with a 1,000-year-old pot unearthed in Israel, said he was satisfied with his ruling and not concerned about the present confusion over phone service. But he admitted to one nightmare. "My nightmare is that I'll someday pick up a telephone and there won't be a dial tone," he said.

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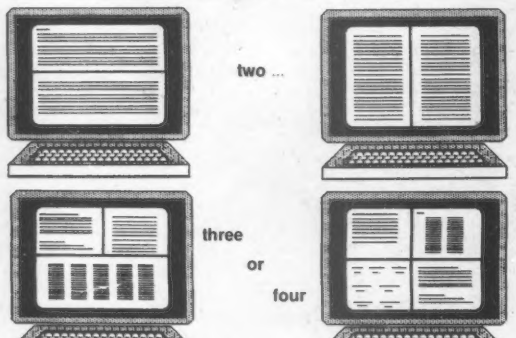

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Infomatics '84 taps Singapore

SINGAPORE — Top-level executives from prominent companies in the information management industry will forecast and discuss strategies for the office of 1990 at Infomatics '84, the International Information Management Congress' annual conference and exhibition to be held on October 2-4 at the Hyatt Regency Hotel here.

Panelists will include John O. Frisvold, vice-president of 3M Co.'s Office Systems Division, who will take a brief look at computer-assisted retrieval; Dr. Robert J. Kalthoff, president of Access Corp., who will appraise optical disks; Edward T. Keating, president of Datagraphix, Inc., who will discuss the use of computer-output microfilm with word processing, electronic mail and other new applications; and J. Raymond Sutcliffe, vice-president and general manager of Eastman Kodak Co.'s Business Systems Markets Division, who will speak on the "Opportunity and Perspective for Micrographic Systems: A 10-Year Look."

In addition to the keynote presentation, the Infomatics '84 Congress will include 23 educational sessions, as well as exhibits by 35 major companies.

Registration price for the congress is $400 for the full slate, including banquet and reception, all sessions and exposition; $360 for all but the banquet; and $185 for one day. More information can be obtained from Infomatics '84 at P.O. Box 34404, Bethesda, Md. 20817.

How Dan Feeney Made The Micro To Mainframe Connection

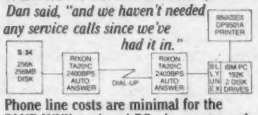
Dan Feeney, systems manager at Alumax Mill Products in Morris, Ill., decided that line charges on one of his IBM model 12 terminals were too high. His firm's corporate headquarters in Chicago was using it to print sales and price reports from the plant's S/34 in Morris and to do online financial modeling.

A PC, Dan reasoned, could do the modeling with any one of the spreadsheet programs available and the reports could be "bicycled" the 50 miles to Chicago. Dan had the terminal removed and bought a PC. The executives were initially pleased with the new system.

"After a period of time the Chicago management missed the communications with the plant," Dan said, "Each week there's a deadline and they must have the reports the same afternoon we produce them. Couriers just couldn't get the reports there in time."

Dan began to question his prior decision to get rid of the headquarters terminal. He looked around for a way to restore communications without having to put the terminal back in. After looking at what was available, he decided to try the BLUE LYNX package.

"It worked the first time we tried it," Dan said, "and we haven't needed any service calls since we've had it in."



Phone line costs are minimal for the BLUE LYNX equipped PC when compared to the charges on the model 12 that was previously in the headquarters office. Also, the total cost of the PC with BLUE LYNX was much cheaper than that of the terminal and printer. Seven hours a day the PC is now off-line running the spreadsheets. The on-line report printing takes only a short time with a 2400 baud rate running over switched lines.

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Husband, wife take different paths to OA configuration

CW AT OFFICE INFORMATION SYSTEMS CONFERENCE

By Edward Warner
CW Staff

CHICAGO — When it comes to the proper means to configure an office automation system, the Mambrettis, a computer-savvy couple, follow different paths.

He, a senior staff analyst with the University of Chicago Computation Center, says decentralize. She, a product manager for Deltak, Inc., says centralize, with terminals accessing a host.

It is not that the Mambrettis personally support either configuration, but rather, it is that both work for employers that epitomize opposite extremes in the two current paths of providing office automation. And each path, the couple said, is appropriate to its application.

The Mambrettis were interviewed by *Computerworld* at the Office Information Systems Conference, held here recently.

Deltak, a producer of training materials for office automation systems, has massive word processing and communications needs that cannot be met by a decentralized system of what are often stand-alone personal computers, even in a local-area network, Catherine Mambretti explained.

The firm's writers, she said, work at roughly 40 terminals tied to a Wang Laboratories, Inc. OIS system consisting of two CPUs that communicate with a typesetter. Forty other terminals are configured with an IBM mainframe host, she noted, for all in-house development work.

Her husband, Joe, meanwhile, said that the University of Chicago's office automation system is mostly decentralized and that "we have hundreds of different micros on campus."

More micros are soon to come as well, he said. The university is part of the consortium of colleges being provided with Apple Computer, Inc.'s Macintosh models at a discount.

Why is the university's office automation system so decentralized? Joe pointed to the fact that it has a 1½-square-mile campus and added that "everyone has different individual needs."

Catherine, though, had another explanation: "In our company the budget [for office automation] goes into the DP department. In the university, every department has its own budget."

Catherine expects that the future of office automation will be one of compromise, reflected in the rise of distributed data processing systems.

DP support seen crucial to OA

By Edward Warner
CW Staff

CHICAGO — If managers want to implement effective office automation systems, they had better first get the support of the data processing department.

That was the advice of consultant Amy D. Wohl, president of Advanced Office Concepts Corp., Bala-Cynwyd, Pa., who spoke at last week's Office Information Systems Conference here.

Wohl claimed that gaining the involvement of the DP department is "the only way I can figure to get [office automation] done right now."

The data processing department's support is needed, she explained, because "DP controls too much information. One-third to one-half of all you want to do in office automation has to do with sharing or manipulating stuff in the DP area."

None of the firms she has advised on office automation, she noted, has "seriously advanced" without the support of the data processing department.

One outgrowth of the reliance on the data processing department for office automation help, she said, is the rise of specific subdepartments within data processing to control and support the incorporation of office automation. Those departments, which carry titles such as office information systems and department of office technology, typically provide office automation users with evaluations of equipment, software development, packaged support and even corporate guidelines on how the systems will be integrated.

Wohl also warned against the acquisition of outdated technology, citing 8-bit machines as an example. Personal computers and not terminals, she said, are now the machines on which to base an office automation system. She added, though, that none of her clients has stopped buying terminals, though all are buying more personal computers.

Those personal computer-based workstations must be ergonomically designed, have at least 256K bytes of memory, allow easy upgrades to special features — and not cost more than $5,000 to $10,000, she continued.

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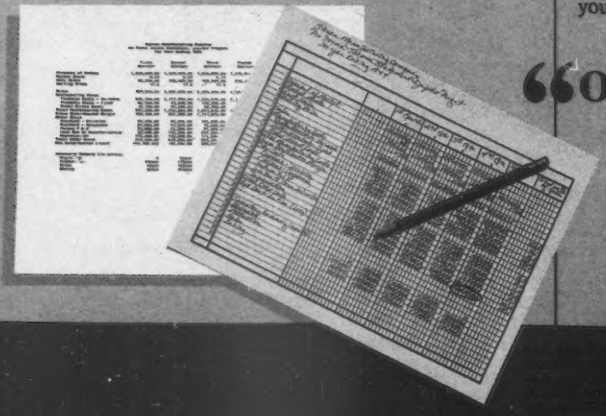

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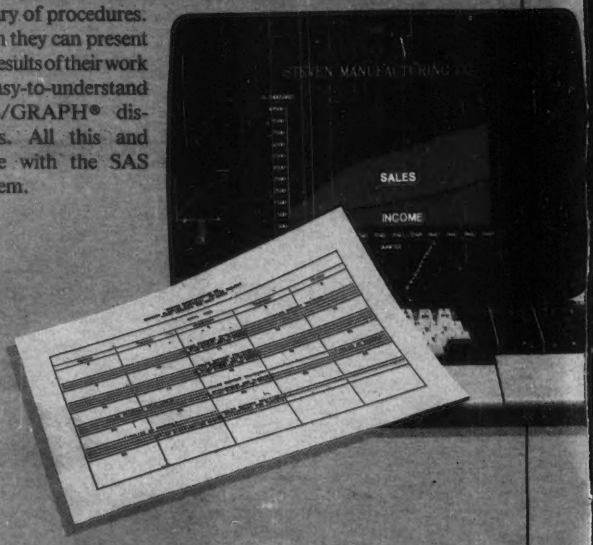

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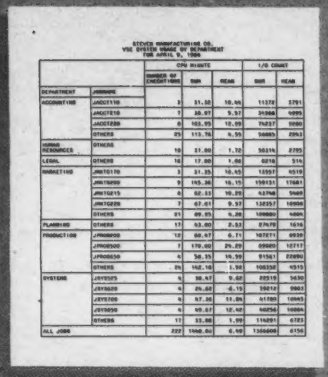

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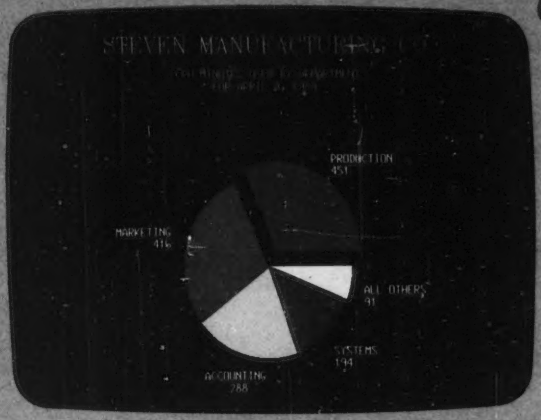

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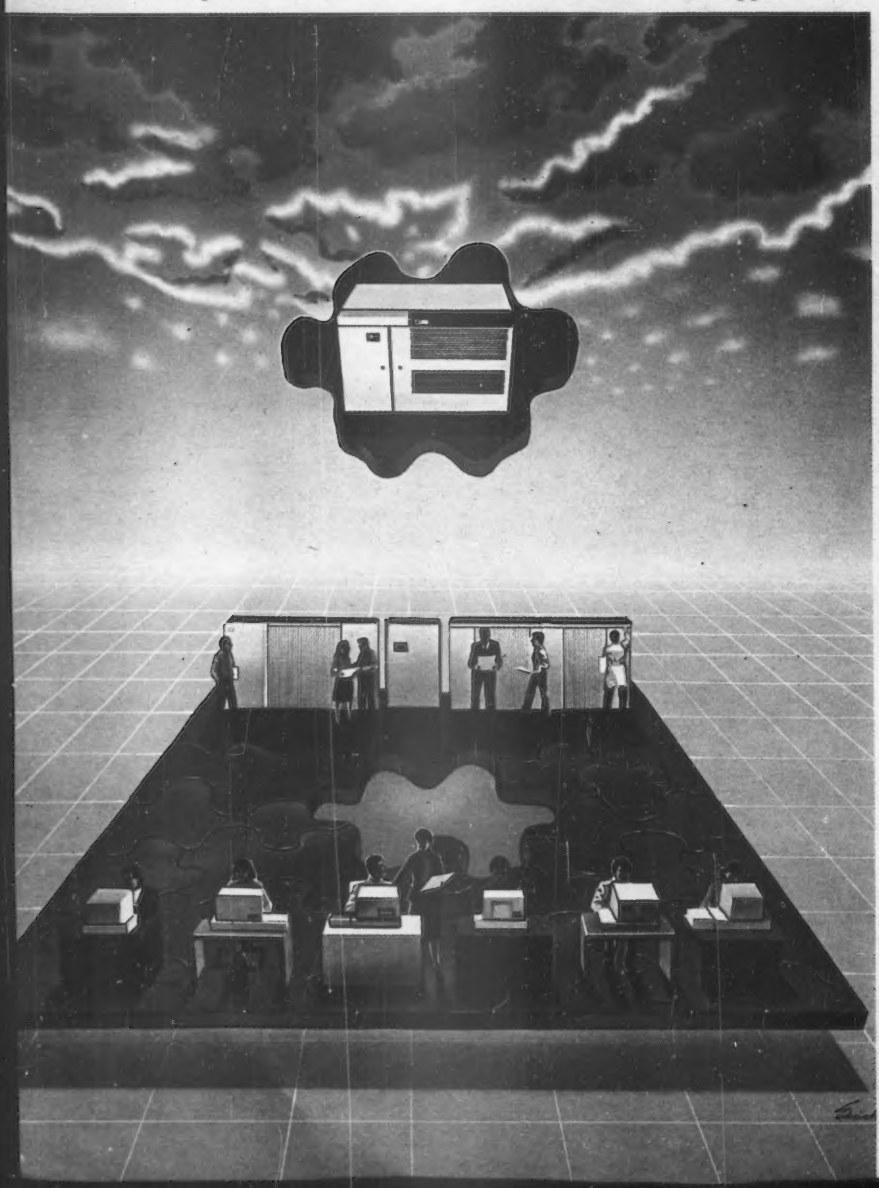

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NEWS

Taiwan's Computex '84 features host of IBM-compatible micros

By Charles Hintermeister
Special to CW‡

TAIPEI, Taiwan — Taiwan's largest commercial computer show ever, Computex '84, concluded early last month after a seven-day stint here.

A total of 145 firms (all but two were domestic) were on hand and sold approximately $7 million worth of microcomputers, peripherals, software and related equipment to the more than 90,000 show visitors. According to Computex '84 organizers at the Taipei Computers Association, this year's event was 30% larger than last year's.

The main attraction at the show was the island's new crop of 16-bit IBM Personal Computer compatibles. More than 10 local companies exhibited such systems, but to the dismay of the estimated 1,000 potential foreign buyers in attendance, the projected products have long lead times and will only be produced in small quantities. This is due to the acute shortage of components here, a spokesman said, especially the Intel Corp. 8088 chip needed to produce these machines. According to recently released government statistics, Taiwan requires about 30,000 sets of the 8088 each month, but only gets about 10,000.

Nine of the Personal Computer-compatible systems on display were based on a prototype system developed here last year by Taiwan's Electronics Research Service Organization, a quasi-government organization, and have been formally recognized by IBM as not violating any of its patents or copyrights.

Almost none of the Apple Computer, Inc. Apple II look-alikes — for which Taiwan is famous — were in evidence at the show. In fact, the show's sponsors warned all exhibitors that counterfeit products of any kind were strictly prohibited. To drive home this point, show organizers awarded cash prizes of $500 to those who wrote the best essays and designed the best posters on the subject, "Why Commercial Counterfeiting is a Dead End."

Taiwan's only other computer show is Information Week, an educational computing event held in early December.

Hintermeister is a Taiwan-based correspondent for the South China Morning Post.

Bill to limit home micro tax credits

WASHINGTON, D.C. — U.S. House and Senate conferees last week sharply limited the business tax deductions and credits available for home computers that are used for business work or personal financial management.

The conferees, working on a major deficit-reduction tax bill, decided that business depreciation and tax-credit benefits for home computers would be permitted only if the taxpayer can present a statement from the employer that the computer is a "condition of employment." In addition, the business tax deductions can be had only if the computer is used at least 50% of the time for business.

These provisions would become effective for computers placed in service after June 18 and applied retroactively from the time the bill is enacted later this summer.

The moves are part of an effort by Congress to raise federal revenues through a variety of measures that curb tax abuses, such as taxpayers taking large business tax deductions for home computers used only rarely for business.

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NEWS

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AUSTRALIA

MELBOURNE — National Mutual T & G Life Co. has launched an extensive program to automate its operations and all of its agents' functions. The program is expected to result in an order for 250 Australian designed and manufactured dual-processor Labtam computers from Labtam International Pty. Ltd.

■

MELBOURNE — The British companies GEC Computers Ltd. and Prestel International are the big winners in the long-awaited contract for a national videotex network awarded by Australian Telecom. The Australian suppliers involved in the contract are negligible, according to sources here. Information providers will have access to the system in August, and Telecom plans to offer the service to the public in February 1985. The network will be called Viatel and will be modeled after the UK's Prestel, which boasts 1,200 information providers and 44,000 users.

■

LUCAS HEIGHTS — The Australian Atomic Energy Commission has become the fifth Australian operation to select the Unix-based superminicomputer from Pyramid Technology Corp. in the past four months. It follows Monash University, Jetabout, the Royal Military College and Overseas Periodicals Ltd.

CHINA

BEIJING — A three-way cooperation agreement between Burroughs Corp., the Hong Kong-based Ever Bright Industry Co. and China's Yunnan Electronic Equipment Plant has been signed here. The agreement is one of the most far-reaching between China and foreign countries, according to a spokesman. It calls for Burroughs' B20 series to be produced at the Yunnan facility and in Hong Kong. The Chinese-manufactured systems are intended for sale within the People's Republic of China.

FINLAND

HELSINKI — Representatives from more than 20 countries attended the 1984 World APL Congress, held here recently. The Congress featured a full program of technical papers and discussions and simultaneous exhibits by major manufacturers and suppliers of APL-based services. The event was cosponsored by the Finnish APL Association and the APL special interest group of the Association for Computing Machinery. Exhibits included Ampers, Inc.'s battery-powered lap APL computer; Analogic Corp.'s array-processor-based APL Machine and IBM's APL2 Program Product. STSC, Inc. introduced the APL Plus/Unx system, an extended version of its APL Plus/PC system, and an APL compiler for in-house installations that reportedly enables existing APL programs to operate three times faster.

JAPAN

TOKYO — Fujitsu Corp. unveiled a series of mainframe systems here, composed of the Facom 330E, the Facom 320E and the Facom M-310E, and a new operating system called Osiv/Espiii. The mainframes feature disk storage up to 47G bytes, and their virtual memory can reportedly be expanded to offer twice the performance of Fujitsu's existing product line. The systems can be configured with up to 48 of the vendor's Facom 9450-II microcomputers, the vendor noted.

The Osiv/Espiii operating system is said to function as a relational data base system and applications development and management system, with menu operation and a control language. It features communications capabilities and can link micros to host systems. The Facom products are scheduled for release in October.

■

TOKYO — Mitsubishi Electric Co. Ltd. has launched a superminicomputer called the Melcom70 MX/3000, which is intended for computer-aided design and manufacturing applications. The system features image processing and communications capabilities, as well as high-speed fourier exchange and a matrix processing facility, according to the vendor.

The system has a cache memory storage of 128K bytes and main memory of 64M bytes. The system's operating system is called OS 60/OMX, which reportedly combines the functionality of Unix with the vendor's real-time operating system. The system is priced at $100,000 and is slated for October delivery.

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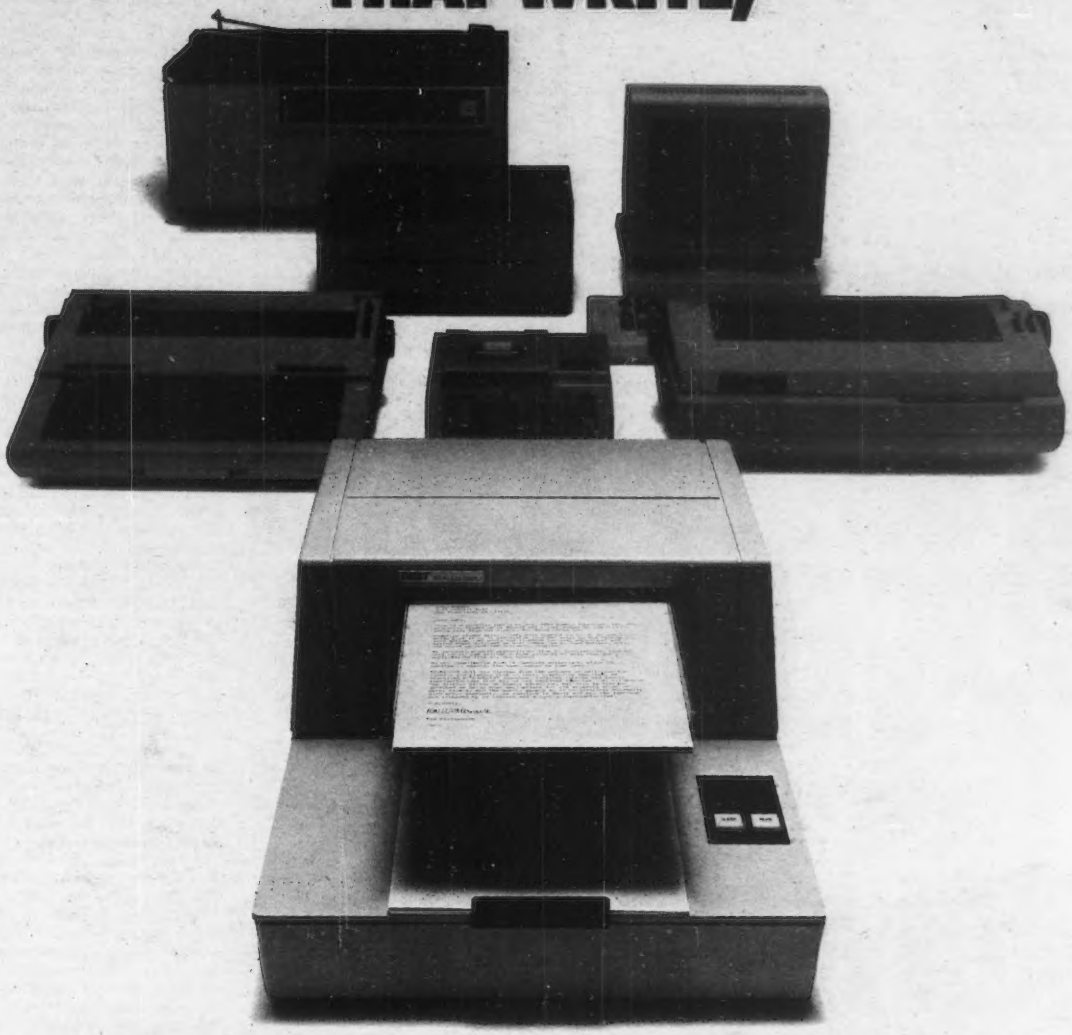

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NEWS

Distributor keeps tabs on beer sales with inventory system

DENVER — A beer distributor here was awash in inventory and accounting problems before it switched to a computerized inventory and distribution system several years ago.

Back in 1980, Premium Beverages, Inc.'s 40 route sales employees were employing a pen and pencil method of filling out invoices and balancing their collection books. But much to the company's dismay, invoice errors had reached unacceptable levels; more than 500 such errors were made during November of that year alone.

Additionally, at each day's end, the salespeople were spending hours trying to locate overages and shortages. On average, it took a sales person 1½ hours to close out his books. Any shortages that could not be located were automatically deducted from the employee's paycheck — a deduction that for some amounted to $2,000 a year.

Overages also were a problem, according to Marilyn Duncan, director of administration for Premium. "Any overage that could not be accounted for meant that Premium was overcharging its customers," she said. "This was poor for our image."

These errors also amounted to additional work for the company's accountants, who had to correct invoices and inform customers about them. Postage for error correction notices alone cost $1,400 per year.

In an effort to rectify the situation, the company arranged that year for a pilot installation of four Norand Corp. Route-Commander portable computers. The Route-Commander is a two-piece portable computer system consisting of a hand-held data entry terminal, the 101XL, and a briefcase-sized printer.

The programmable, battery-operated 101XL has a program memory of 16K bytes, expandable to 24K bytes, and a data memory of 16K bytes, expandable to 32K bytes. It features a 16-character alphanumeric display and a 20-key keyboard.

Vast improvement

By January 1981, invoice errors on the four routes serviced with the Route-Commander system had been reduced to none, prompting Premium to purchase an additional 36 units — one for each route, the company said.

Today, all the company's salespeople carry the Route-Commander when they make their deliveries. Assigned product codes are already stored in the system's memory, as well as the prices, promotions and allowances for each customer.

The salespeople simply enter product numbers and quantities, and the computer automatically calculates the final price. When the 101XL is inserted into the briefcase printer, customer invoices can be printed showing line-item detail of all transactions.

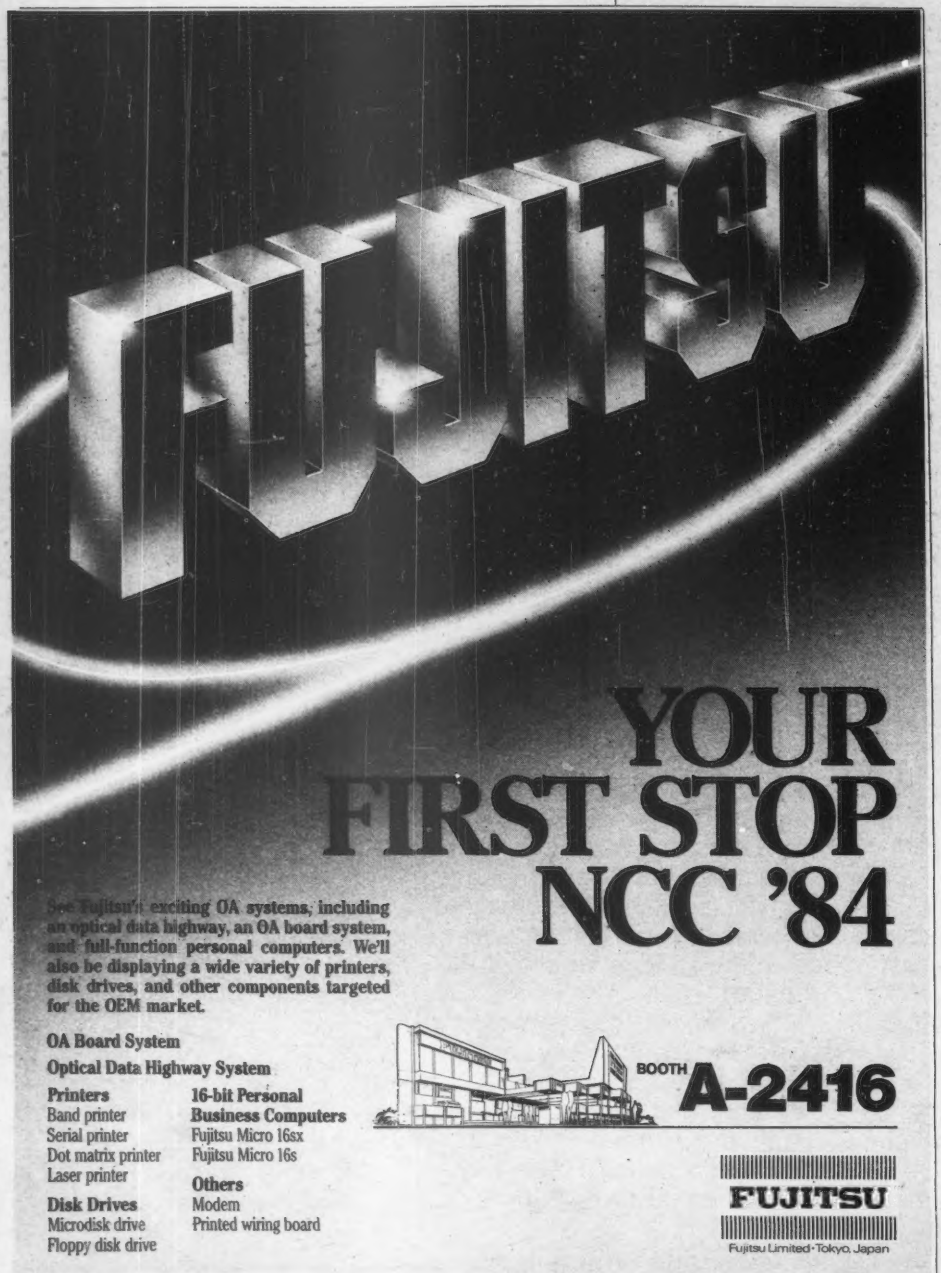
"The Route-Commander (system) has virtually eliminated all the invoice errors we previously had to deal with," Duncan said.

The computerized system has saved time for route salespeople in the warehouse, allowing more time for point-of-purchase decisions and more personalized customer relationships on the road.

Ben Reiff, executive vice-president, cites inventory control as a major reason for Premium's decision to invest in the computers.

After every delivery, each salesperson produces an on-truck inventory report that tells him how much of each product he has left. Time is saved because he does not have to manually count the merchandise. This also eliminates the embarrassment of running out of product before the end of the day, Reiff said.

"Today, a salesman may come back from a day's deliveries over or short, and know that minute, that night, where the error was made and correct it."



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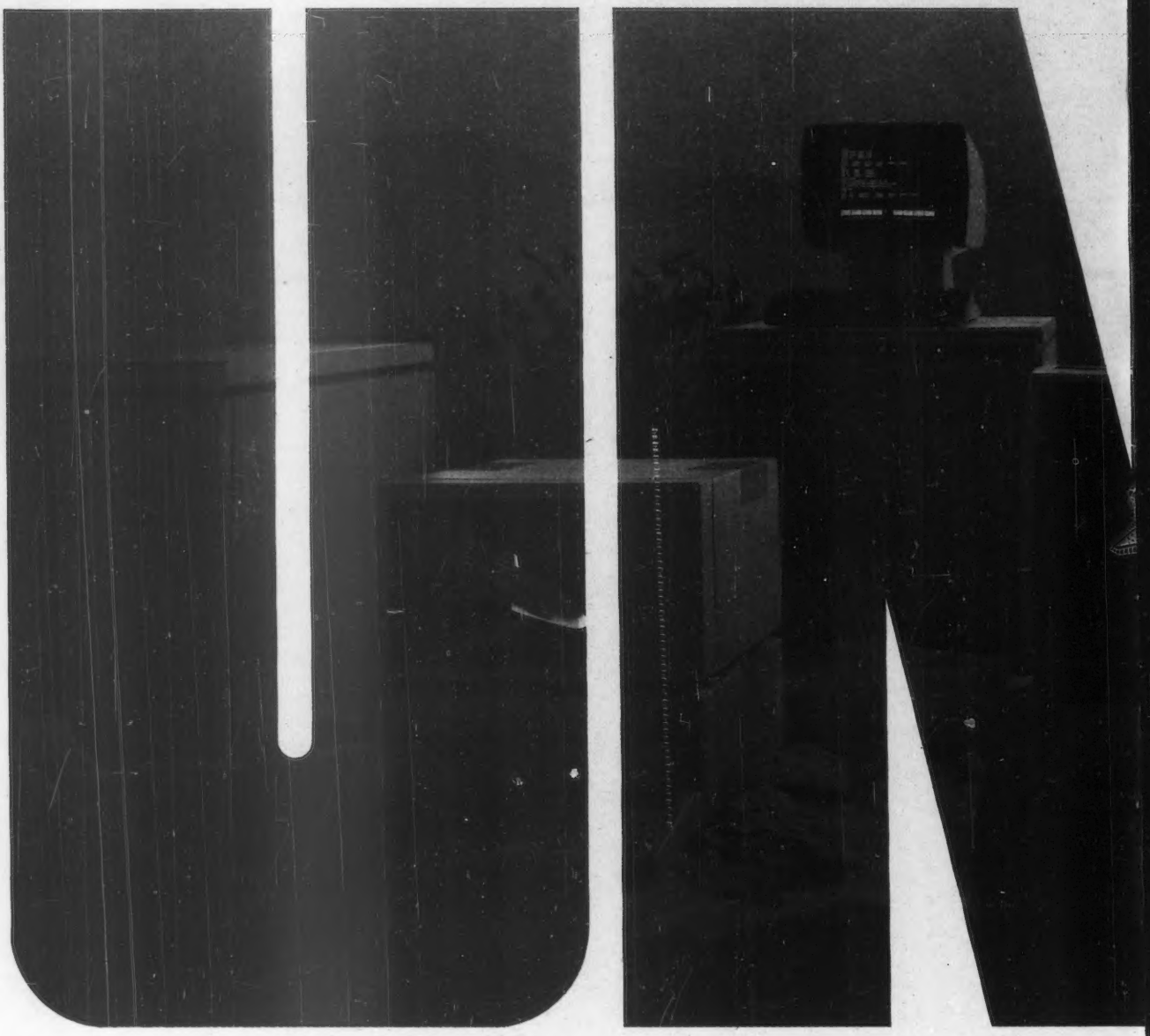

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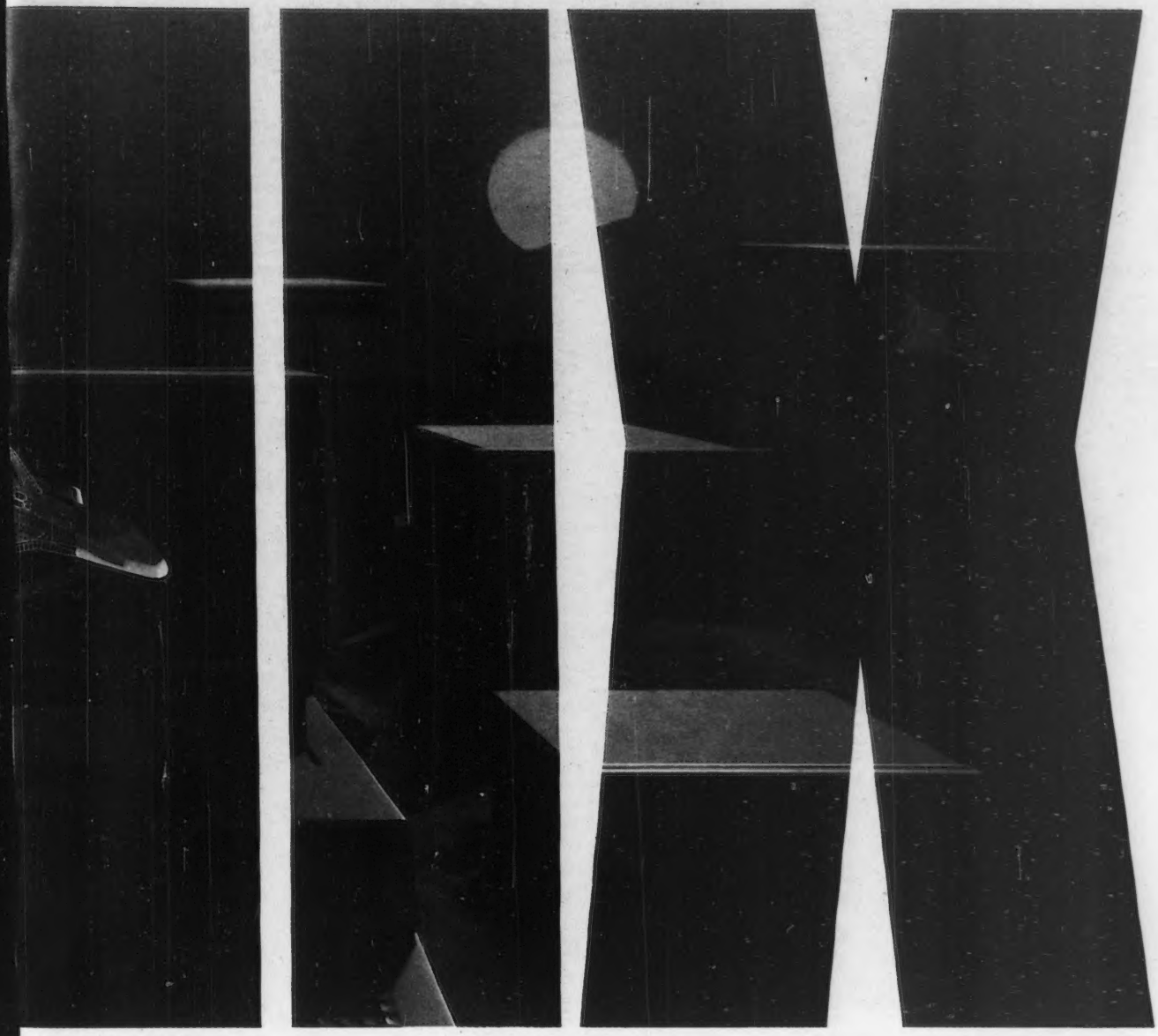

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NEWS

ACM elects Goldberg president; Lee, Wood also named to top posts

NEW YORK — Dr. Adele Goldberg was recently elected president of the Association for Computing Machinery (ACM) for a two-year term beginning July 1.

Presently the manager of Xerox Corp.'s Systems Concepts Laboratory in Palo Alto, Calif., Goldberg previously served as ACM secretary and member of the Executive Committee (1982-84) and member of the Publications and Special Interest Group Boards.

Also elected to ACM positions were Dr. John A. N. Lee, as its vice-president, and Dr. David C. Wood, as its secretary.

Lee, professor of computer science at the Virginia Polytechnic Institute in Blacksburg, Va., was previously ACM council member at-large (1982) and chairman of the ACM Standards Committee.

Wood is a department head at the Mitre Corp. in McLean, Va. Chairman of the ACM Standards Committee, he has served as Capital Region Representative on the ACM Council since 1980.

He is past chairman of the ACM Special Interest Group on Data Communications (Sigcomm) and was chairman of the Sigcomm 1983 Symposium.

M&D users set August meet

WASHINGTON, D.C. — McCormack & Dodge Corp. (M&D) will hold its seventh annual user conference August 19-22 at the Sheraton Washington hotel here.

Guest speakers will include Commodore Grace Hopper, one of the authors of the Cobol programming language; Dr. Thomas Peters, coauthor of *In Search of Excellence*; and Larry Welke, the founder and president of International Computer Programs, Inc.

John Landry, M&D's executive vice-president, will speak on the variety of new directions in the software industry.

Registration fees are $495 for participants registering before July 30 and $545 for those registering after July 30.

Further information is available from M&D at 1225 Worcester Road, Natick, Mass. 01760.

Seminars to eye bypass issues

WASHINGTON, D.C. — A seminar on "Telephone Bypass Technologies and Economics" will be held by Telestrategies, Inc. from July 19-20 at the Sheraton Crystal City Hotel here and again at Chicago's Hyatt Regency O'Hare from Nov. 1-2.

The seminar's target audience includes large corporate users and manufacturers. The instructor for the seminar will be Dr. Jerome G. Lucas, founder of Telestrategies, who has technical experience in satellite communications, digital transmission, voice-data switching systems, image processing and optical fiber implementation.

Topics to be addressed include digital termination systems, two-way cable TV, local access strategies and charges, mobile radio telephone and real estate telecommunications and teleports.

The registration fee for each seminar is $895.

More information can be obtained from Telestrategies through P.O. Box 1218, McLean, Va. 22101.

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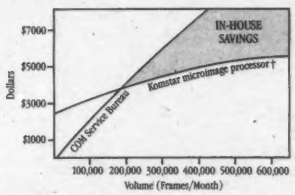

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Finally, there's one software vendor offering a sophisticated software information network capable of meeting all of your corporate, departmental and personal information software needs—The New Cincom Systems. Organizations around the world are discovering that working with Cincom's integrated family of products enables them to greatly improve both performance and productivity. Here are just 10 of the many reasons why you should be considering the New Cincom software information network for your company:

#1 Relational Data Management Technology

Powerful relational data management technology forms the "nucleus" of our software information network. Using a unique "Logical View" concept, all applications operate directly with "derived relational tables." As a result, we can provide complete data structure independence, as well as the high performance needed for today's production environments. This relational technology is the nucleus of both our TIS™ family of information products for IBM users and our ULTRA INTERACTIVE DATA BASE SYSTEM™ for DEC™ VAX™ users.

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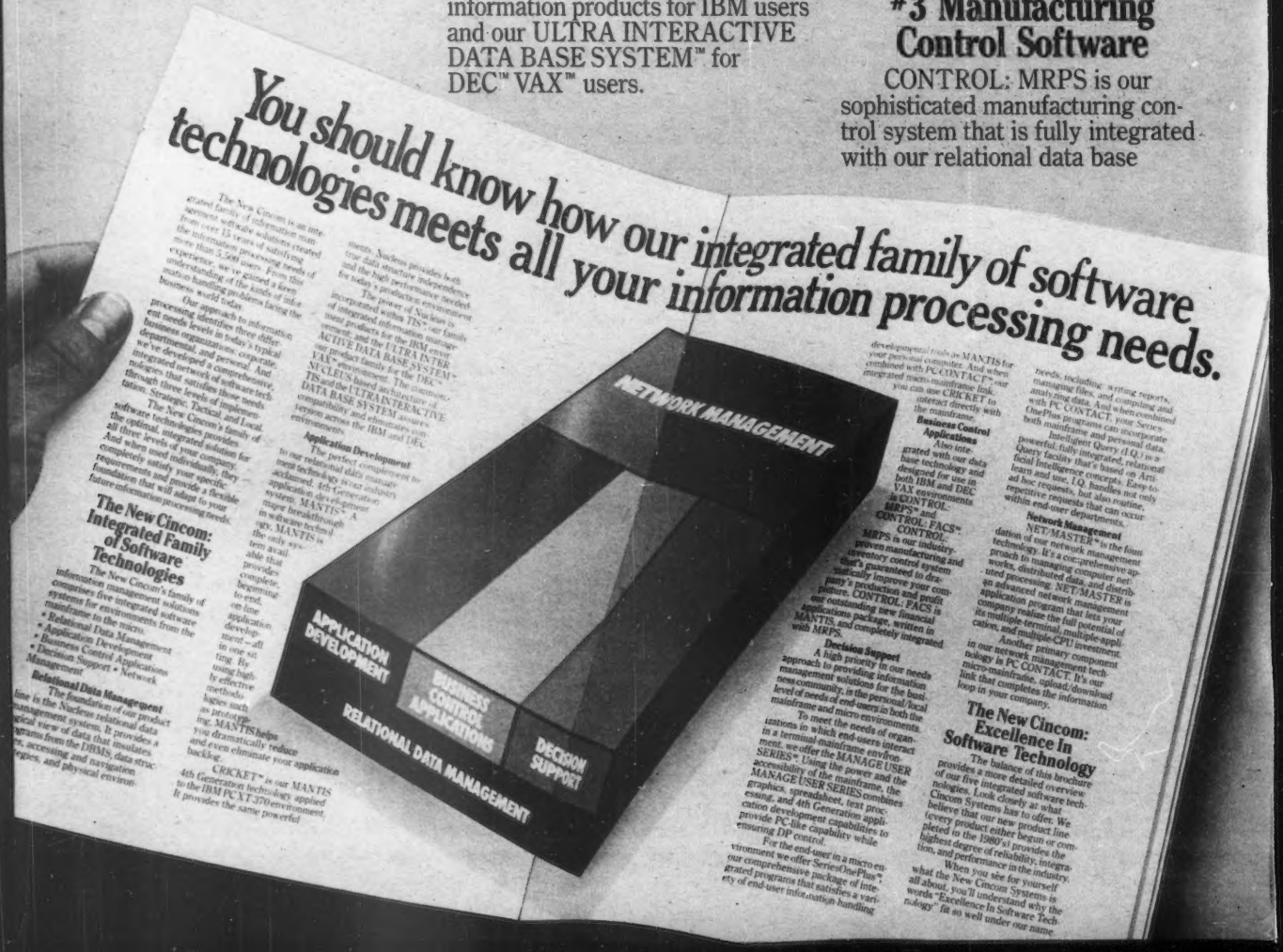

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technology. A complete closed-loop system, MRPS is improving the productivity and profitability of over 125 IBM and DEC VAX manufacturing environments around the world.

#4 Financial Control Software

CONTROL: Financial is our sophisticated financial accounting and control system which molds to the way you do business. Integrated directly with MRPS, CONTROL: Financial includes Accounts Receivable and Credit Management systems with Accounts Payable soon to follow.

#5 Advanced Network Management

NET/MASTER™ is one of the most recent additions to the New Cincom family of integrated products. Very simply, NET/MASTER is an advanced network management system that takes the complexity out of managing a sophisticated IBM computer network and lays the groundwork for distributed data base processing.

#6 The Interactive Mainframe–Micro Link

Further expanding the capabilities of our software information network is PC CONTACT, our mainframe-micro link which enables users to interactively upload/download data between the mainframe and IBM PC's. PC CONTACT gives the PC user the ability to access multiple file types stored in the corporate data base for Decision Support manipulation.

#7 Micro Decision Support Software

For comprehensive micro-level Decision Support we offer SeriesOnePlus™*. SeriesOnePlus includes file management, spreadsheet, graphics, reporting and word processing components that are all integrated through a unique "BUS" architecture. Because the system is designed exclusively for business situations, SeriesOnePlus complements any mainframe-micro network strategy.

#8 Mainframe Decision Support Software

The recently introduced MANAGE USER SERIES™ provides powerful Decision Support capabilities for the mainframe user. The MANAGE USER SERIES combines graphics, spreadsheet, text processing and application development tools to enhance the use and display of corporate data.

#9 Client Support

The one thing that isn't new about Cincom is our unrivaled commitment to service, support and user education. When you choose Cincom you can be assured of the highest caliber of support.

#10 Software Excellence

Why the New Cincom? Well, we like to think of ourselves as the New Cincom because every product in our software information network has been released since 1981. And, quite frankly, we believe our new products provide the highest degree of reliability, integration, performance and value in the industry. As proof, just look at our sales. From 1982 to 1983, TIS sales rose 136%, MANTIS sales rose 50%, and MRPS sales rose by 45%. For even more proof we invite you to personally compare our products with what our competitors are offering. Then you'll understand why the words "Excellence In Software Technology" fit so well under our name.

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Local-area nets get high marks from Georgia Tech

ATLANTA — The Georgia Institute of Technology, located in the downtown area here, is multiplying the effectiveness of its on-campus computer technology by linking mainframes, word processors, professional workstations, computer terminals, personal computers and printers via local networks that transfer information at a rate of 500 page/sec.

The first step in Georgia Tech's campus automation plan was to install a Xerox Corp. Ethernet local communications network in the institute's Rich Computer Center. The network links a variety of computers, word processors and terminals to the center's Xerox 8010 professional workstation and an attached high-speed multifont laser printer. The latter device produces complete pages, using a xerographic process, directly from digitized images.

Several Ungermann-Bass, Inc. Ethernet-type networks have also been installed within various Georgia Tech buildings, and these, along with the Rich Computer Center network, are interconnected by fiber-optic cable.

The campuswide network links the school's five mainframe computers and over 500 separate terminals, explained John Gehl, assistant to the institute's associate vice-president for information and technology.

Some personal computers used by students and faculty are already attached to this network, Gehl said, and the number is growing rapidly. "These networks basically add value to the equipment we already have on campus," Gehl said. "They are an important step toward our learning how best to use and benefit from the new technology constantly becoming available to us."

The campuswide network is being designed by Georgia Tech's Office of Telecommunications and Networking. Stayton D. Addison, head of the office's engineering section, expects major productivity gains and cost savings once all faculty members are on the system and once "we can implement our plans for putting a port into every dorm room."

Addison expects to realize cost savings by monitoring usage, billing users individually and taking advantage of the system's flexibility by moving terminals from low-use to high-use areas. He is also developing security procedures that will make it possible to handle all supply purchase requests electronically. Addison sees an immediate cost savings: increasing researchers' efficiency in performing their work.

> *'We're dealing with people here who would never sit down at a typewriter.'*
> — Dr. E. Jo Baker, associate vice-president for academic affairs

Another significant benefit of the new system is that, by making high-quality in-house printing accessible from throughout the campus via Xerox 8010 workstations, it saves both time and money.

Dr. Patricia White, a research analyst in Georgia Tech's Office of Academic Affairs/Institutional Studies, began putting out the institute's annual *Fact Book* on the Xerox 8010 system after receiving eight hours of instruction.

Dr. E. Jo Baker, associate vice-president for academic affairs, said she values the Xerox system not only because it "saves us money previously spent on sending copy out to be typeset," but also because "we're dealing with professional-level people here — people who would never sit down at a typewriter, but who do sit down at the 8010 professional workstation."

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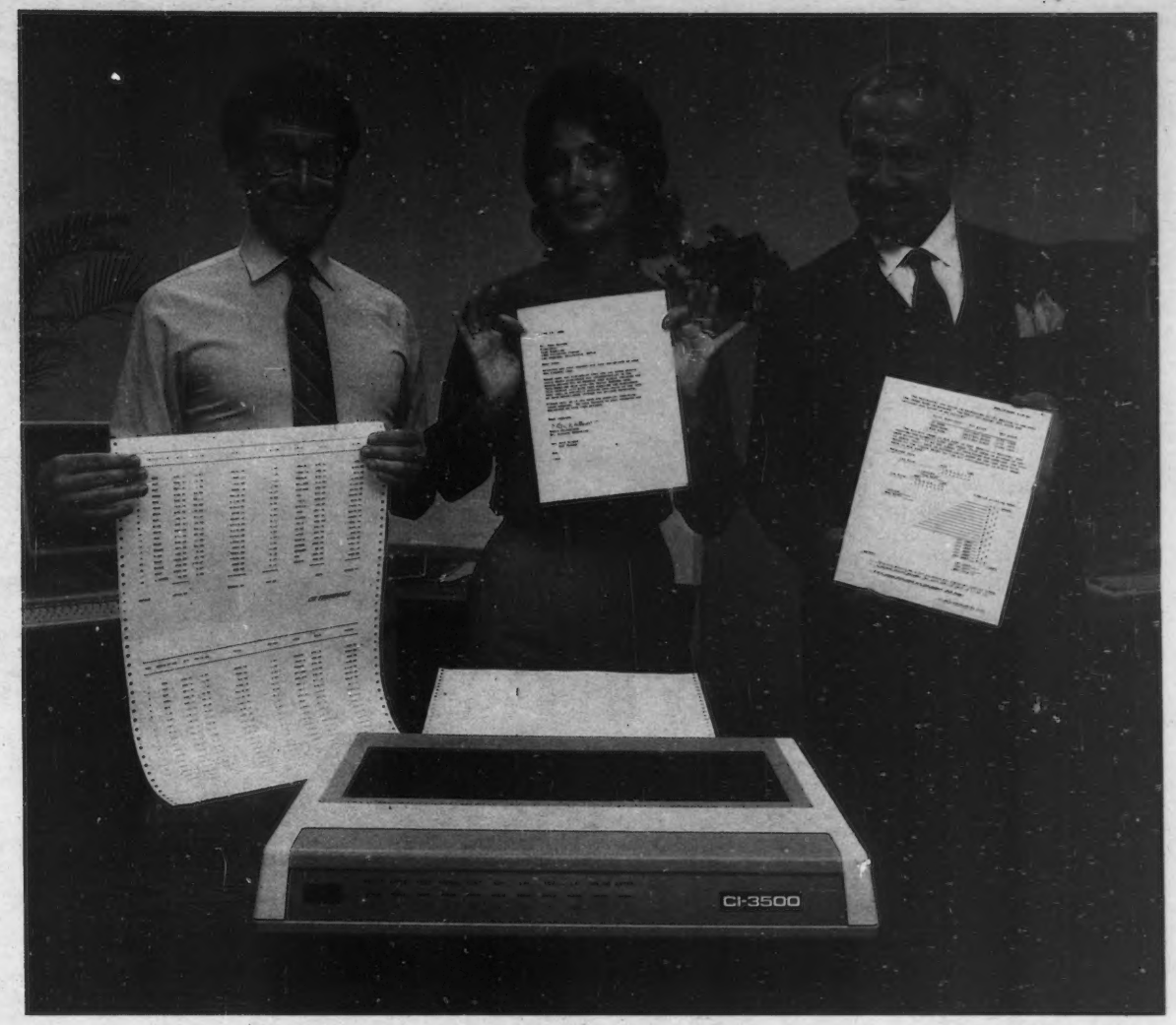

You won't get over what this 350 CPS printer does for under $2,000.

When you see what the CI-3500 Serial Printer can do, you might not believe it's priced under $2,000. Besides giving you data processing printing at 350 CPS, the CI-3500 delivers letter quality printing at a rapid 87 CPS—more than twice the speed of most daisy wheel printers.

And you also get the capability for high resolution graphics, up to 240 X 144 DPI.

The office friendly CI-3500 is as flexible as it is versatile, especially for a table top, workstation printer. For example, a convenient interface cartridge system allows you to change your printer interface simply by changing cartridges. A DEC-LA100® compatible cartridge is standard, but additional cartridges are available for interfacing with other systems, such as the IBM PC.

A similar font cartridge system accommodates multiple fonts and character sets, so you can avoid costly PROM installations.

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If you have a Personal Computer PCI speaks your language.

The PCI 1076 protocol converter from Protocol Computers, Inc. can support your Personal Computer – Apple, Cannon, DEC, Hewlett Packard, IBM-PC, Kaypro, NEC, Osborne, Sanyo, Sony, Tandy/Radio Shack, MOD, Xerox, etc, etc, etc – in IBM's SNA/SDLC world.

Simply, conveniently, economically, the PCI 1076 makes IBM SNA hosts talk to your Personal Computer in its own language. It converts the Personal Computer's ASCII code to appear as the SNA/SDLC protocol used by IBM hosts, and vice versa. But before showing you how we support Personal Computers in IBM's world, here's how to support your own Personal Computer vocabulary.

GLOSSARY:

ASCII (American Standard Code for Information Interchange) The language spoken by most Personal Computers.
ASYNCHRONOUS Low speed, low cost modems used with most Personal Computers.
BSC Some Personal Computers support, via existing programs, the BSC (Bisync) protocol. See PCI 71B/SNA for SNA-compatibility.
CoaxFACE™ Exclusive PCI converter allows you to drive Personal Computer using standard coax cable, without re-cabling with RS-232C.
FULL SCREEN The ability to modify an entire CRT screen of data without interruption of host.
MODEMS Provide terminal/CPU digital interface into an analog signal for the phone lines.

and want to talk to IBM,

PaperCRT™ ASCII hard copy keyboard terminals have all the versatility of 3278 CRTs with this PCI option.
PCI (Protocol Computers, Inc.). We're making the non-IBM world IBM-compatible.
SDLC (Synchronous Data Link Control). Expeditor for moving data in IBM systems.
SNA (System Network Architecture). Network for moving data in IBM systems.
SNA/SDLC Non-compatible with Personal Computers' ASCII language (without PCI).
SYNCHRONOUS High speed, high cost communications device for communications with host computers.
PCI 71B/SNA When using Bisync running on the Personal Computer, PCI 71B/SNA protocol converter makes it SNA-compatible.
PCI 78 Networker™ Keystroke for keystroke 3278 keyboard compatible terminal.
PCI 1076 Makes Personal Computers function as 3278s.
3274/76 IBM controllers which support 3278, 3287 devices in an SNA/SDLC network.
3278/3287 IBM's CRT; IBM's printer.

HOW PCI SPEAKS THEIR LANGUAGE.

The PCI 1076 facilitates communication to and from the Personal Computer with absolutely no change in host application programs. When you use your Personal Computer's display and keyboard, they appear and function as 3278s.

If you need printed reports, PCI's exclusive "Dynamic Printer Assignment" feature addresses the Personal Computer's printer as if it were a 3287 over a single communication line. And, the PCI 1076 allows the Personal Computer's diskette to store data from, and send information to the host system.

PERSONAL CONNECTIONS.

The PCI 1076 gives you tremendous flexibility for those locations with PCs.

- Make a direct connection using standard RS-232C cable.
- You can connect-up with existing coax cable, eliminating the need to re-cable with RS-232C. Using coax from 5 to 5,000 feet, the Personal Computer may be installed at the remote end, the PCI 1076 in place of 3274/76s – and the RS-232C conversion is provided by PCI's CoaxFACE.™
- You can connect to existing 2-wire twisted pair cables installing the Personal Computer at the end of a point-to-point link with the use of our asynchronous line devices.
- Or, you can take your Personal Computer home, on the road, wherever. To make an asynchronous ASCII dial-in connection, simply use low cost modems and acoustic couplers.

PCI OPENS YOUR OPTIONS.

The PCI 1076 has a graphics terminal interface that lets you use ASCII graphics terminals on your SNA/SDLC network as 3278s. With our PaperCRT,™ ASCII hard copy keyboard terminals have all the flexibility of 3278s, including capability to full screen edit on paper with portable hard copy terminals from anywhere in the world – just pick up the phone.

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1051: ASCII to Sys 34/36/38 5250 emulation.
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1071: ASCII to BSC 3270 emulation.
73SX: SNA/SDLC through X.25 connection interface.
1076X: ASCII to 3270 SNA/SDLC through X.25 networks. (With PAD included.)
Videotex 67: SNA/SDLC to Videotex protocol conversion.
PCI 51 Networker: Keystroke for keystroke 5251 keyboard compatible ASCII CRT.
PCI 7887 Plus: IBM-PC software package for 3270 emulation.
PCI 5156 Plus: IBM-PC software package for Sys 34/36/38 emulation.

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Send more information on:
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NEWS

Protocol converter gives university 24-hour CPU access

PROVO, Utah — Faculty and staff members at Brigham Young University (BYU) here were putting the pressure on communications and data base coordinator Kelly McDonald two years ago to allow them access to the BYU mainframes on something other than IBM 3274 terminals.

The users primarily were after information on student records in the BYU data base, stored in an IBM 4341 mainframe. McDonald, coordinator in BYU's Administrative Computer Center, began shopping around for a protocol converter.

He looked at 12 products and decided in January 1983 on Local Data, Inc.'s Datalynx bisynchronous protocol converter. "It worked fine," McDonald said, but because it could not attach directly to the mainframe, still more speed was required. It was in September 1983 that Diversified Data Resources, Inc. of San Rafael, Calif., came up with the Hydra II direct channel-attach protocol converter. The Hydra II attaches directly to the mainframe's byte multiplexer channel.

"The advantage of it was high speed," McDonald said. "When you have 16 terminals trying to hook in at once, speed becomes a factor."

The Hydra II is said to allow microcomputers from IBM, Apple Computer, Inc., Kaypro Corp. and Tandy Corp., and Ascii terminals and assorted peripherals to communicate with an IBM mainframe and to drive printers linked to that mainframe.

When the converter was first brought up, "hardware-wise, it was extremely smooth. Software-wise, it was a little flaky in the beginning," McDonald said. The vendor was helpful in working out the software bugs, and "it's been fairly stable since," McDonald said.

"The Hydra II gives us a lot more uptime and the benefits of new technology with no real additional hardware costs," he added.

Powered by a Zilog, Inc. Z-8000 16-bit microprocessor, the Hydra II was designed to eliminate any need for front-end communications controllers and remote software. The Hydra II provides 24-hour dial-up access to BYU's 4341 mainframe; a feature that McDonald said "can't be underestimated.

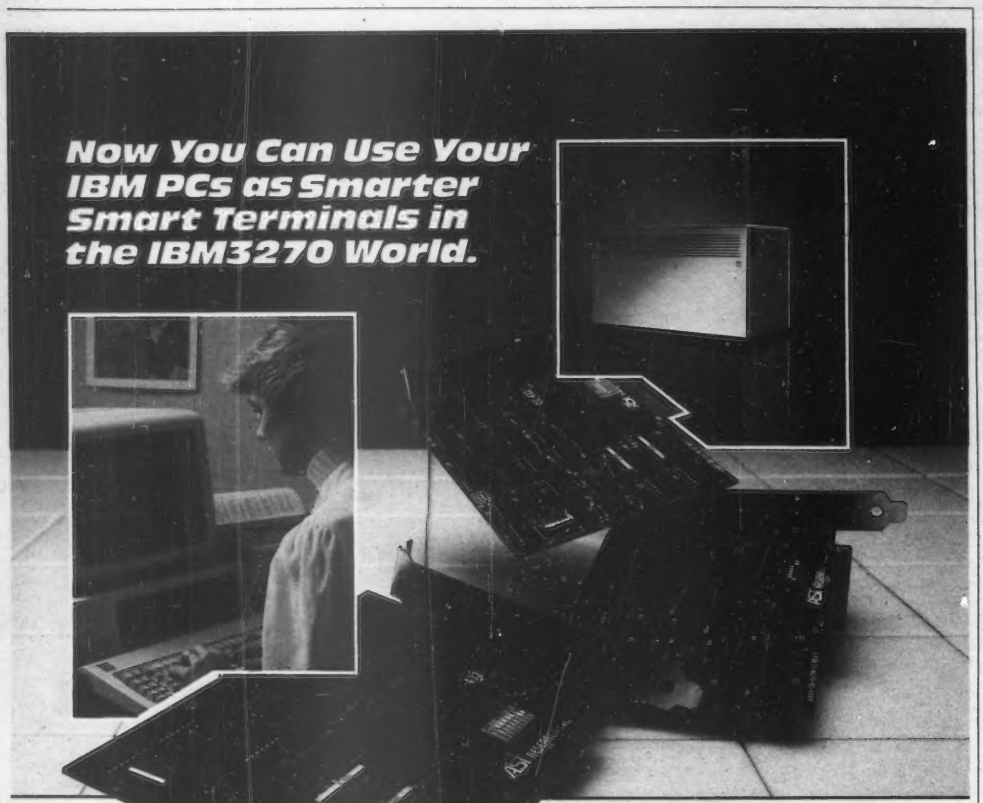
"In any large IBM production organization with a lot of processing, you may have eight to 10 on-call problems a week." McDonald said problems involving such things as student grades or class enrollment cannot wait until tomorrow, which means rousting a programmer out of his bed at night.

"Some of our programmers live 30 miles away, and we've actually had people quit because of the frequency of night calls," according to McDonald, who has driven to campus at 3 a.m. himself. "We still have to wake them up, but having the Hydra II lets the programmers dial up the mainframe and work out the problems at home on their own computers." Should a drowsy programmer forget to log off the Hydra II and the mainframe software, the Hydra II automatically sends a logoff sequence to the host mainframe.

McDonald said he is also pleased with the Hydra's printer support capabilities. "Most remote protocol converters advertise printer capability, but to support the printer, an extra layer of software is required in the host mainframe. With the Hydra II, all our printers look just like a 3211 or an IBM 1403, and no additional software is required by the mainframes," he said.

BYU now has a total of five Hydra IIs. About 100 different peripherals utilize the Hydra IIs locally or via modems from remote sites. Among the peripherals are two Microdata Corp. minicomputers and serial printers from Dataproducts Corp. and Printronix, Inc.

"The Hydras are also compact in size, giving us added flexibility in arranging our hardware," McDonald noted.



More and more, people in your company want to access data from the mainframe. And since IBM PCs are in (while dumb terminals are on their way out), you need one good source for a complete family of micro-to-mainframe communications products.

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For starters, there's our new AST-SNA family. Hardware and software that let your PCs talk to your mainframe (and let the mainframe talk back) via the SNA/SDLC protocol. Giving you all the facilities of a 3270 terminal. And with the computing power of your stand-alone PC maintained!

Plus, the basic hardware can support multiple protocols. And you can support a variety of emulations from a single PC. Or support additional PCs by using one as a cluster controller. An arrangement (with up to four PCs) that can save you a lot of money. You can even attach low-cost ASCII CRTs to a PC and emulate 3278 Model 2s.

What's more, our AST-BSC package lets you work in a 3270 BSC environment and still migrate to 3270 SNA/SDLC without hardware upgrades. Another way to save money and aggravation.

Still, there's more. For example, if you have an IBM 3274/3276 Cluster Controller, our coaxial connection hardware is your answer. Once installed (via coax-A), it lets your PC retain its stand-alone processing capabilities and emulate a 3278/9 terminal. With no performance degradation!

You can even use our AST-3780 to support 3780 RJE batch communications. Which gives your PC the ability to operate unattended. And transfer program, data or text files between your PCs and an IBM host at very high speeds.

AST is the only supplier that can give you a complete line of PC-compatible products. Communications hardware and software for 3270, 3780 and 5251 environments. I/O and memory expansion cards. And utility programs.

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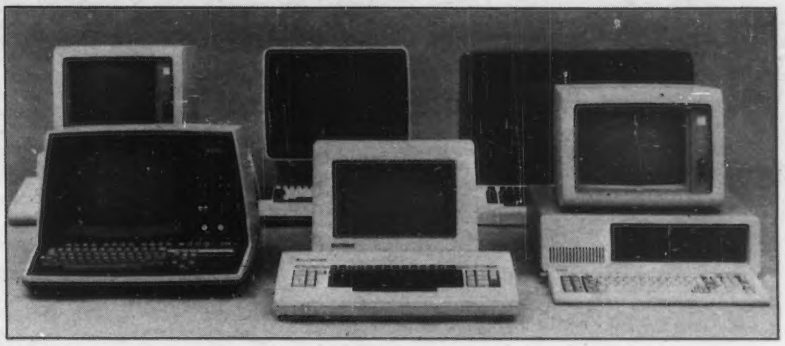
Making multi-vendor office systems work together requires just one thing.



Soft-Switch.™

The idea seems simple enough: connect all of your office systems so that documents can be freely interchanged for editing, storage, display, and printing. That includes word processors, PCs running word processing packages, and mainframe terminals accessing DCF and PROFS.

Many vendors claim to connect multiple vendors' equipment through "protocol translation." And connect they can, but not communicate. To really communicate requires transforming the document coding so that it is fully editable at the receiving system.

Soft-Switch is compatibility

ITI's Soft-Switch is a program product for your IBM mainframe (MVS or VM) that allows users to send documents to other users with document translation performed automatically, to store documents in host libraries, and to retrieve documents from these libraries.

Soft-Switch communicates with IBM, Wang, Xerox, and NBI. It communicates with the MultiMate word processing program on the IBM PC, with DCF and with PROFS; with the IBM 6670 laser printer, and with standard hard copy printers.

Soft-Switch is totally consistent with evolving standards for office systems. In fact, Soft-Switch integrates multi-vendor office environments by first translating a document into IBM's level 3 Document Content Architecture (DCA), and then into the exact format required by the receiving workstation.

Soft-Switch solves today's problems

Let's say an analyst prepares a document on his PC with MultiMate. He executes Soft-Switch (which executes in the PC, as well as in the IBM host) and specifies distribution to his secretary's Wang word processor and to the 6670 laser printer down the hall. Soft-Switch provides the micro/mainframe link, transports the document from the PC to the IBM host, translates the document from MultiMate format to DCA, translates the DCA format to Wang's WPS format and the IBM 6670 laser printer OCL format, and routes the documents to their final destinations.

Soft-Switch: a path to tomorrow

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Graphics service helps small firm compete with giants

WASHINGTON, D.C. — "A firm our size can't afford an in-house graphics shop," said Harry Vonk, a principal in the Washington, D.C.-based consulting firm, Centaur Associates, Inc. Centaur is a small, 32-person firm competing in an arena of consulting giants such as Battelle Memorial Institute and Arthur D. Little, Inc.

Instead of an in-house system, Centaur uses a system called Meeting Graphics Service (MGS), marketed by 3M Corp.'s Audio Visual Division. As subscribers to MGS, Centaur presenters can order 35mm slides, overhead transparencies and hard copy via a modem-equipped, 300 bit/sec terminal in their office. Using interactive menus, they can select graphics formats from an array of over 100 titles, text, charts, graphs and special effects, then choose colors, edit and proofread before an item is generated.

Centaur supplied the terminal and modem, paid a one-time set-up charge and pays fees based on the number of graphics produced. Long-distance telephone charges are not incurred, and 3M provides a half day of training, a step-by-step user instruction book, telephone coaching and production and delivery.

Since its founding in 1968, Centaur has made its specialty assessing the impacts of public policies and programs for federal, state and local governments. Centaur's clients include the U.S. Departments of the Interior, Labor, Energy, Commerce, Defense and Health and Human Resources; the Nuclear Regulatory Commission; the Environmental Protection Agency; and several regional economic development commissions.

"It's hard to know why you win a contract," Vonk said. "If all other things are equal, the client bases a decision on the marginal differences between competitors.

"If you come in with crisp, professional graphics, it makes a statement about your firm. I am confident now that we appear to clients to have in-house graphics capability."

'Crisp, professional graphics [make] a statement about your firm.' — Vonk

According to Vonk, the system offers a user the opportunity to work over, edit, correct, add or delete input to the image without leaving the office and before ordering anything.

"Previously, we could, with lots of psychic pain and anguish, produce rudimentary pie charts and graphs," Vonk said. "But when we wanted presentation-quality graphics, we went outside.

"That meant we had to design the graphics, talk with the designer in his shop, get the mechanicals, proof and make corrections, then turn them back to the shop for final production," he said. "It was a multiday process, out of our control. Changing a word, deleting a line or making last-minute alterations was a trying process.

Centaur uses graphics for marketing presentations, proposals and briefings. Vonk and his partners use color almost exclusively, as opposed to black-and-white material, because "the impact of color is tangible."

"If I can say, 'look at the green bars' or 'look at the red areas,' I'm more effective with a client than [if I say], 'look at the shading.'

"We hold regular briefings on one Pentagon contract — pretty boring statistical information. For years, we gave them using reverse blue or black slides with yellow letters. This year, we used MGS color slides, and suddenly, it was more interesting. For the first time, I got comments on the graphics."

Vonk finds it effective to have colors consistent throughout the presentation. With MGS, he chooses the background color, and the computer supplies complementary colors. On slides with little information, the computer expands the scale to fill the screen.

According to Vonk, the graphics system satisfies 95% of Centaur's needs on a no-overhead, pay-as-you-go basis. An additional service of MGS has also been helpful — that of providing hard copy of each presentation.

"Taking notes tends to distract the audience from the presentation," Vonk said. "They prefer to watch, then receive a copy of it to review later."

Harry Vonk of Centaur Associates, Inc.

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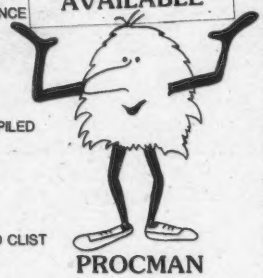

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Nasis meet scheduled

KANSAS CITY, Mo. — The National Association for State Information Systems (Nasis) has announced that the theme for its 16th annual meeting, which will be held at Adam's Mark Hotel here Aug. 6-8, is "Management Techniques in a Changing Environment."

The Nasis meeting will cover office automation, personal computers and micros, divestiture and convergent communications needs. Time has been set aside for regional and national business meetings and idea exchanges.

Registration fees are $150 for government representatives, $250 for private sector attendees and $75 for spouses. Additional information can be obtained from Judie Parish, Nasis Executive Assistant, through P.O. Box 11910, Lexington, Ky. 40578.

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A high-speed paging device was then installed in order to improve TSO performance. Figure 2 is another EPILOG/MVS display which compares TSO response time before and after installing the high-speed paging device.

Note: Both displays were created in a matter of seconds, using simple commands that took less than a minute to enter.

If your data center has frequent hardware or software changes (new applications, more users, tuning measures, new operating system releases, CPU upgrades, more main memory, new disks, etc.), the Degradation Analysis feature of EPILOG/MVS can quickly and simply show you the impact

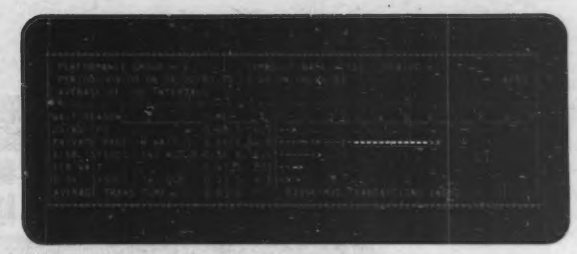

Figure 1. *EPILOG analysis of TSO trivial response time.*

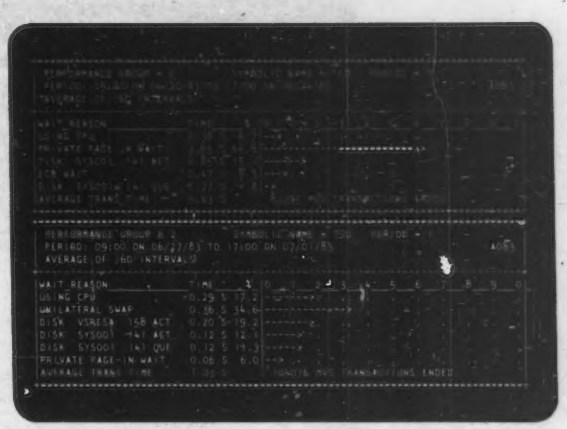

Figure 2. *EPILOG analysis of TSO trivial response time before and after installation of a high-speed paging device.*

of those changes on end-user service and its resource analysis can show you the effect on resources. In this way you can verify that your investment—in time or money or both—is producing the intended results. Or, if not, you can modify your actions and use EPILOG/MVS to check the results again.

Change—almost constant change—is becoming a way of life in a modern data center. With EPILOG/MVS you can be confident of achieving the results you want.

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A-251

Net helps freight firm offer better service, cut costs

DARIEN, Conn. — If a customer of Air Express International (AEI), the worldwide air freight transporter with 1983 revenues of over $275 million, wanted to locate cargo enroute in 1981, the company had to rely on slow, printed teletypewriter reports to come up with an answer.

Today, the answers can be obtained quickly on a real-time basis via AEI's communications network.

Colin Cook, vice-president of data processing for AEI, said, "The previous system was antiquated. This system, [Paradyne Corp.'s Pixnet] allows us to enter the data once and use it however we wish." AEI employs over 1,600 people and ships over 10 million pounds of cargo each month.

Simple to use

AEI investigated networks from three manufacturers. Cook said Paradyne was chosen because "it was simple to install and simple to operate, and it excluded the necessity of additional systems programming support." Paradyne was also able to supply modems and terminals.

The Paradyne system interfaces between AEI's host processor, an IBM 4341 Model 2 with 8M bytes of memory, and two Paradyne local control units at AEI headquarters here. Paradyne letter-quality printers and PDS 270 display terminals are located in AEI's 120 offices around the world.

Data received from the network is presented to the CPU as though originating from a local device, relieving the host processor of the burden of polling, error detection and correction associated with conventional teleprocessing. The result is higher performance and improved response time, Cook said.

When the Paradyne system was first installed in 1983, AEI had problems with protocols. The company has three types of hardware in the U.S. running on three different protocols: data running on the Pixnet network; data on Four-Phase Systems, Inc. minicomputers; and an internal message-switching system. The protocol problems were found to be in Paradyne's software, and the manufacturer cleared them up after "a lot of effort," Cook said. The 34-site national network was installed in less than seven months.

Besides land lines, AEI uses satellite links and microwave. The company employs Cullinet Software, Inc.'s DB/DC network software package to drive the network.

"We have very little time to collect a large number of shipments and push them back out into the airline network. Our communications network captures all our statistical information and carries it throughout the network to allow the company to operate better, take advantage of better rate structures and give our customers an improved service at reduced cost," said Daniel DiGregorio, assistant to AEI's vice-president of data processing.

AEI plans to expand the network into its international offices, which are currently still linked by a private Teletype network.

An integrated network, AEI's system utilizes Paradyne 14.4 bit/sec modems on the backbone links and fans out into 4,800 and 2,400 bit/sec microprocessor modems to provide connections to minis and multiplexers to drive the private telex.

"We're not a transportation company, we are a service company," said John Healy, senior vice-president of AEI. "We need to know where our cargo goes, and the Paradyne system is actually the heart of this service."

Whether AEI is forwarding parts for a tractor, an automobile engine, truck parts or a two-ton oil drill, the company is now able to monitor shipping closely at all times. Cook said, "The most significant thing it's enabled us to do is track our shipments from the point of origin to destination. That's extremely useful from the customer's point of view."

WE SPARKED TH

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Other manufacturers have joined the local area network revolution since then, but DATAPOINT is the undisputed leader, with more than 5,000 ARC local

News service's computers speed futures info to brokers

LEAWOOD, Kan. — Commodity futures brokerage firms, grain elevator operators and livestock feeders and processors often make split-second decisions that can spell the difference between profit and loss in the commodities market.

A news service based here is responsible for fast and reliable delivery of the information that those businesses need to make key decisions. Commodity News Services, Inc. (CNS), a subsidiary of Knight Ridder Newspapers, Inc., feeds to 8,000 subscribers futures quotations, news stories and analyses tailored to particular businesses.

"Commodities futures markets are highly volatile. It is therefore imperative that we send information fast and efficiently to customers so they can keep pace with market changes and, as a result, make profitable trading decisions," said Paul Tucker, senior vice-president of technology at CNS.

Six years ago, CNS scrapped several different stand-alone systems in favor of a Tandem Computers, Inc. Nonstop I processor to handle all of its business. Today, CNS relies on 14 Tandems — six Nonstop II superminis and two TXP mainframes for production and four Nonstop IIs and two TXPs for software development and business functions. A variety of disk drives hold more than 760M bytes of data for the information network.

"We simply cannot be down," Tucker said. "Even if we are down for a minute in the middle of the trading day, we're in trouble."

CNS officials report that the Tandem systems allow for the company's growth. "As our business has grown, the Tandem system has grown right along with it. It's simple to add new processors onto the existing systems — the last two processors we installed were delivered on a Friday, installed on Saturday and in production on Monday morning," said Craig Duvall, staff administrator for technical administration.

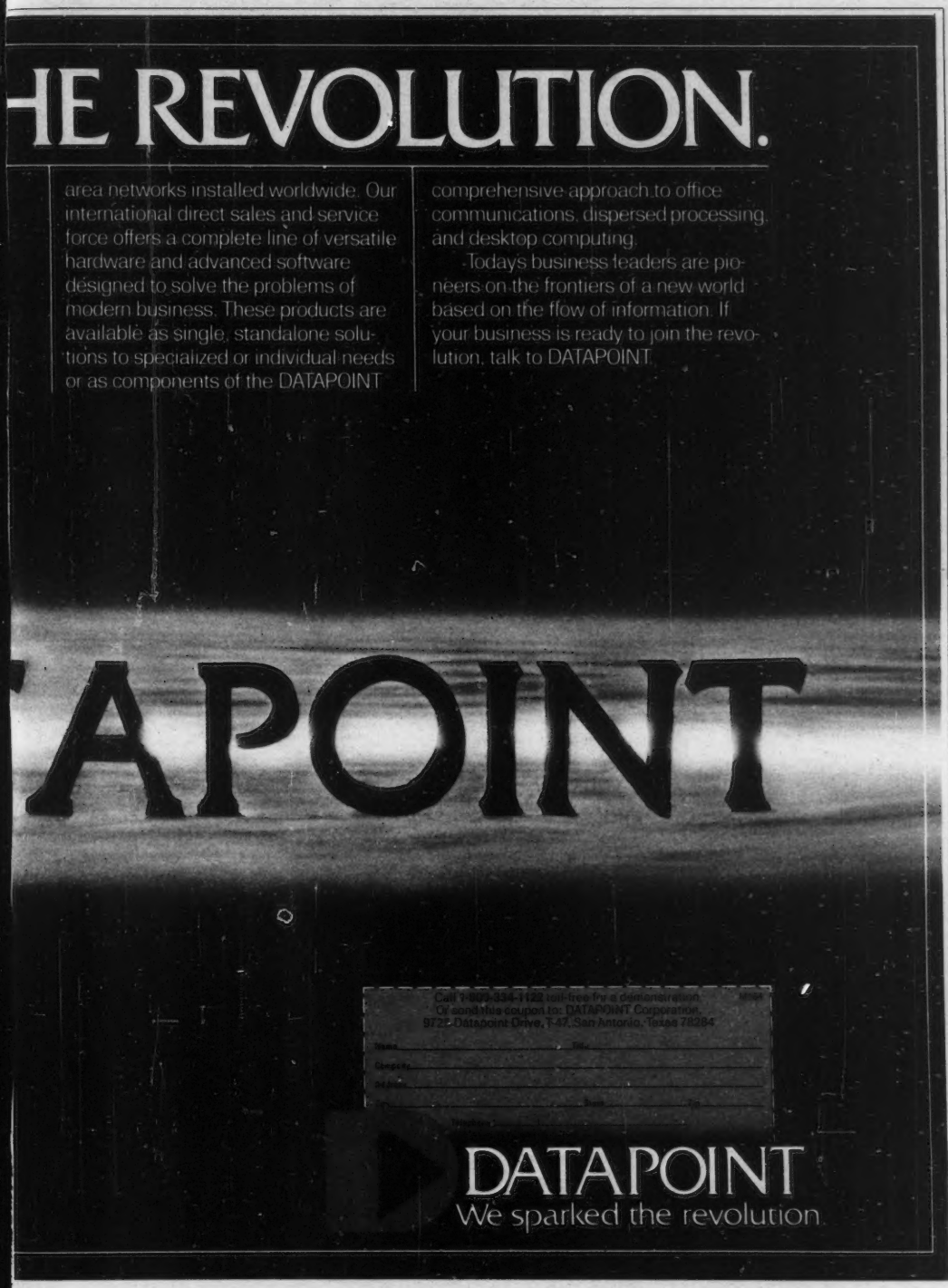
CNS operates six instant quotation systems and 17 individual commodity news wires that cover events affecting the futures market. The Tandem system receives prices from the exchanges via ticker feeds. The information is processed in a ticker network interface, placed in the computer data base and transmitted by drivers to subscribers' terminals throughout the U.S.

Customers receive data in video or printed format. That data is transmitted by telephone lines, FM radio sideband and satellite.

"Many of our customers, particularly those who live in farm-belt areas, are isolated, so we are rapidly expanding data delivery via the Westar IV satellite," said Barbara Ostwald, CNS' managing editor for operations. "The information is beamed to 2-ft receiving dishes installed at subscriber locations and instantaneously displayed on VDTs.

"Because it's a much more efficient and cost-effective way to send data than by phone lines, we plan to use satellite delivery even more in the future," she added.

CNS subscribers can use their personal computers to receive, store and display information. CNS provides a hardware and software package that decodes the transmission signal and presents it to the personal computer in Ascii.



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EDITORIAL

Betting on NCC: 1984's crapshoot

Betting on the success or failure of the National Computer Conference in Las Vegas next week has been the heaviest in recent memory.

The smart money says that NCC this year will be a bust. Las Vegas has many attractions for tourists and conventioneers alike, but it is not the easiest city in the country to get to, for one thing. For another, Las Vegas may be delightful in late fall, but it is about the worst place in the country to hold a major convention in July. There's only one place worse — Houston.

Then, too, businessmen aren't enthusiastic about conventions in summer no matter where they are held — what with vacation schedules and all that. These same vacation schedules impact staffing at DP shops as they do elsewhere, making it very difficult to do without staffers who are supposed to do their work while filling in for those on vacation. We wonder just how many shops that usually send four or five people to NCC will shift gears in deference to the show's timing, sending one or two instead.

Finally, NCC has been lambasted for years because of the size of the crowds that storm the convention center. Exhibitors that pay dearly for exhibit space on the convention floor complain that any kind of serious educational selling is out of the question at NCC.

Why then do they return like lemmings every year? For competitive reasons, chiefly. The fear among vendors is that they may not be noticed if they *are* there, but they will almost certainly be noticed if they are *not* there. And that translates into negative publicity.

This fear notwithstanding, many top mainframe product vendors, particularly software companies, will not appear at the show this year. Absent will be companies like Software AG of North America, Inc., Informatics General Corp., Pansophic Systems, Inc. and Hogan Systems, Inc. Company messages seem to get lost at NCC because it's so big and diverse, according to one of the software vendors skipping the show this year.

There's a potentially bigger problem looming than timing and weather. At the recent Computerized Office Equipment Expo in Chicago, all of 900 people showed up on opening day, making the 14,000 square-foot exhibit hall look more like a ghost town than a bustling trade convention. An official with the show's organizers blamed the poor attendance on the fact that the previous two months had seen several computer-related shows in the Chicago area. Is the industry simply reaching a saturation point with the numbers of shows and conferences available?

The American Federation of Information Processing Societies, Inc., the show's primary sponsor, contends the show will be a success in terms of attendance. But last year, for the first time, Afips declined to release attendance figures for the 1983 Anaheim, Calif., show. Could it be Afips didn't want comparisons made with attendance for 1984?

Show officials report some 650 vendors will be on the floor in the Las Vegas convention center, more than were in Anaheim. Afips could well be right.

This one's a crapshoot, and we're not betting.

'No comment.'

LETTER

A place for code modules

Jeff Thompson's opinion on the academic version of structured programming in his "Don't blame structured programming" [CW, May 28] hit the mark, with one exception: There is a place in a well-structured program for modules that are executed only once.

An important and unmentioned part of structured programming is a well-thought-out, top-down design of program functions. This usually involves the evolution of a nebulous description of purpose into a hierarchic structure of statements, increasingly detailed at each level, until each statement can be converted easily into a code module.

When designing a program in this manner, one finds that in addition to modules that are called many times or from many places (two clear justifications for module formation), there are modules that come to exist simply from the journey from nebulous to concrete, from breaking a sequential but expansive function into more easily pondered steps. By incorporating these latter modules into the program as they are, rather than placing their code into some higher level module, the programmer preserves more completely the structure of the original design and incorporates into any given module the level of detail originally addressed when designing that module. A subsequent reader of the program is given the benefit of the designer's approach to structuring the program's functions and is not forced to deal with enormous changes in the level of detail while reading through a particular module.

Bill Kilgore
Marlboro, Mass.

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VIEWPOINT

New manframe

LECHT ON SCIENCE
Charles P. Lecht

There has been a lot of talk about man's role in an increasingly automated society. I, for one, have the conviction that whatever that role may be, it's got to be better than the failure-prone one he has thus far fulfilled. Before we see a truly monumental improvement in the quality of our lives through automation, a lot more of it will be required. And although some setbacks may occur until we get enough automation, I hold the optimistic view that if we don't become diverted, our reward is assured. Indeed, with each setback, we are given the most convincing evidence of why we yearn for so much computer help in the first place.

Consider some of the dumb things we do, like loading our own physical selves with all manner of computing equipment and then carrying this stuff around just about everywhere we go. Is there clearer evidence that synthetic intelligence is required to augment our natural stuff? Having taken on the burden of carrying all manner of modern entertainment technology — recording devices, radios, electronic pianos, portable TVs — as we go about under our own power, we have now seen fit to add the computer, peripherals, printer and all to our load. The panoply of hardware is enough to make some executives on a trip look like a walking electronics shop, or worse yet, a gawky human mainframe — a manframe.

The computer started to find its way onto our back just about the same time it took its first tentative steps out of the computer room of the late 1960s. In the early 1970s, some computer components actually managed to make their way onto us (literally) and into our clothing. By now, computers have taken possession of our wrists, wallets and laps — with our knee tops being the latest so under seige. It was the arrival of the knee-topper that finally caused me to pause to consider our increasing adornment with all manner of computer hardware. Is our technology so pervasive and all-consuming that we now have to carry it around? Did we fail so in closing our classic computer rooms to distribute data processing that we now have to carry their contents around with us? Or are we still stumbling, trying out a lot of things that we will no doubt later discard? Endeavoring to keep an open mind, I naturally asked, "What about our latest innovation — knee-toppers — do we really need them?"

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Acceptable places for computers

Now our hands, pockets, laps and straps are joined by the region of the thigh, just above the knee, as an acceptable place where we may want to locate our computing devices so these can be operated while we are engaged in activities that take us away from home and/or office desktops — sports, travel or a vacation at Aunt Betty's cabin, far beyond the reach of our all-engulfing electrical service networks.

There are real benefits to knee-toppers, so don't think I am against them as I analyze below what they bring us. Until now, men, women and children were all forced to use both hands if they wished to operate a computer while walking, running, swimming or skiing. With the availability of knee-toppers, especially those small enough to rest on one knee and to be attached to it in some way, we are free to do just about anything physical while using a computer, except give a swift knee to, say, a stubborn mule. Now if you don't think that's something special, I don't know what in the world is. When you consider how many business deals are consummated on ski slopes, yachts, tennis courts and polo fields, it's astonishing that the knee-top computer wasn't invented earlier than, say, the desktop computer.

So, we are now free to move about on our own power while performing a wide variety of computer-based activities — with one or even two hands free to do other things and without having to hang our system from a strap or to load it into our pockets until the linings reach below where they ought. Affixing a computer to our knee top by use of a garter, laces, a velcro strip or possibly one of the new superglues, we can type a Pascal program while strolling or, with a more rugged military version, jogging.

Scuba divers, parachutists and others equally active who may require intermittent use of their hands, and even laps, for purposes that are more urgent than operating a computer, will be overjoyed to know that they no longer have to leave their computers behind when they embark upon a new adventure. Now computer power is available in highly portable, waterproof, knee-top models that leave the hands free to fight off sharks, pull rip cords or what have you while the nifty knee-topper hums merrily along without skipping an instruction.

We cannot help but be impressed with this new technology. Conveniently affixed on the thigh to make its keys easily accessible, but not so high up as to make its wearer appear risque when he is actually using it, the knee-topper promises to be a showstopper at the next consumer electronics show, wherever it is held.

Those who stand to benefit the most from the new upper-leg-based systems are the plain old professional nine-to-fivers, who comprise the backbone of America's industry. This silent majority of executives — who don't ask for (or get) very much as they unselfishly and joyfully go about doing their jobs, knowing that the cause they serve is beyond their (or anyone else's) comprehension — these are the people for whom the knee-top computer was designed.

Ever mindful of the nine-to-fiver's needs, knee-top systems architects studied every conceivable way to produce a system the executive on the go could truly appreciate. Talk about user-friendliness! Systems with soft, moldable backs allow the knock-kneed executive to port his device above his kneecap without fear, ridicule, discomfort or pinching.

As with hand-held computers, knee-toppers are

See **KNEE** page 46

Here's to the land of the DP free

HUMAN CONNECTION
Jack Stone

Now that the Fourth of July is rolling around again, we all can look forward to a welcome period of relief from this thrill-a-minute industry and return, albeit for a very short time, to the traditional values of yesteryear, like those linked to visits with parents and siblings at the family home for the annual steak barbecue and the many joyous hours reminiscing and exchanging hilarious stories about our more frivolous days, eccentric friends and the romantic adventures of our teenage kids.

Prior to this year's celebration, I made a visit to my homestead in the Midwest and had a delightful chat with my oldest sister, Doris.

"So, I heard the rumor about your beloved husband wherein he is finally going to write that book on the history of hypertension therapeusis. Jeez, it's about time — he's been talking about it for 30 years," I said.

"Well, it's true, particularly now that he has his very own personal computer and has quit asking me to lug mine home from the office every day."

"I suppose you're running into the usual compatibility problems."

"Yes, but it's a toss-up as to whether we need an independent computer consultant or a marriage counselor. What's far worse, I'm in trouble with the maid. She keeps complaining about the floppy disks that are strewn all over his study and has even offered a copy of her diskette library control program to help him clean up his mess."

"So how's your son Larry feeling these days?"

"Well, he finally debugged his [Apple Computer, Inc.] system, the one that's driving the signboard in Chicago's coliseum during the baseball games. His newest application deals with sychronizing the signboard with the music, the cheering of the fans and that crazy chicken."

"Sound's like he's really doing well. Now tell me — will you be seeing your grandchildren soon?"

"They're coming in from Denmark in just a few weeks, and I've been busy looking for some toys. You know, Jonas is already five and has asked me for a decent system to help him learn English. So far I've found the Teach and Learn computer by [Mattel, Inc.] This machine gives him six packaged applications, each with its own overlay, which will allow him to interact with a programmed voice on diskette in a tutorial way. I'll have to give him some initial hands-on instruction in its use because the systems documentation is not all that easy to follow.

"Majken's 10 now and growing fast. Let me read part of the letter I just received from her. 'Dear Mormor' — that's Danish for mother's mother — 'I'm learning to play the piano and really enjoy it. I look forward to visiting you in America soon. While I'm there, please buy me the Casio PT-80 Elektronishe Musikinstrumente. It has 32 piano keys that also function as controls to make selections from the four melodies contained in the read-only memory pack. I really like the versatility that comes from its eight present sound and 12 rhythm keys, although I'm not sure I'll get used to the Chicklet-type design. And give a kiss for me to Altemor.' That's Danish for great-grandmother."

"By the way, I almost forgot to ask — how is mother doing?"

"Surprisingly well. Uncle Chick gave her an electronic adding machine that has LED readout, five arithmetic functions and standard adding machine paper. It threw her for a while, but her practice with the programmable microwave keyboard and her seven-day selection videotape recorder has certainly advanced her training level and increased her keyboarding proficiency. She's even completed subtraction now and is preparing herself mentally before attacking the multiplication key.

"For the time being, she's trying to master the new portable telephone that your brother Harold gave her for Mother's Day. One thing really throws her though, and that's the telephone's autodial function. When she called long distance to thank Harold for the gift, she must have set his number in register because now, whenever she accidently touches the control key, she hears the familiar greeting, 'Harold here.' In her embarassment, she responds with, 'Sorry, dear, just testing, testing, testing . . .' " ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

Who's to blame?

Jeff Thompson's "Don't blame structured programming" [CW, May 28] leveled some serious charges against the academic community for its approach to teaching structured programming.

Structured programming is a set of general program design considerations and techniques that make coding, debugging and maintenance much faster, easier and less expensive.

Thompson's assertion that schools have perverted structured design concepts by propogating "such bastardizations of the original intent as one-time PERFORMs, complete elimination of GOTOs and unnecessary nesting of IF statements," which he says results in "decreasing readability and increasing long-term maintenance cost and program inefficiency," is in error.

First, the credit for these perversions cannot rest with the academic community; rather, these were in use by the DP community long before colleges started teaching them. Second, these concepts do not decrease readability and increase maintenance, but instead they enhance one's ability to follow the logic of a program and diminish the effort needed to maintain it.

Finally, Thompson says that structured programming "as taught" by colleges has increased maintenance costs and that maintenance aspects "are not considered in teaching structured programming."

Whereas I find it completely unwise to make blanket generalizations concerning the academic community, I can speak only for our own program; structured programming is taught with a very strong emphasis on maintenance.

Mark Ciampa
Volunteer State Community College
Gallatin, Tenn.

Parallel structure is a useful design guideline that Jeff Thompson casts away in his Example A on structured programming.

Putting the initialization and termination code in-line would hide the important PERFORM among many trivial MOVES or OPENS. The loop condition should be explicitly stated. But aside from that, Example A is fine as it stands.

Martin Gugino
Mayfield Heights, Ohio

In his "Don't blame structured programming," Jeff Thompson contends that one-time PERFORM modules may be inserted in the sequential instruction flow rather than transferred to a module, for example, PERFORM HOUSEKEEPING.

Since the programmer's time is the most expensive factor in maintenance work, I believe that the standardization of housekeeping is a helpful approach.

Some housekeeping includes routines; in a check printing program, one may write a few checks to verify print positioning. When you code all this preparation before starting with the logic coding, the distraction is time-consuming.

Since it may be advisable to execute a housekeeping module only sometimes, I prefer to standardize and assure everyone that all housekeeping chores will always be found in the PERFORM HOUSEKEEPING module.

Thompson's idea of the team design approach is good. I would only add that there should be some compatibility amongst the members. More than once, I have reviewed coding and explained the function to other programmers just to receive an "ahem" for a response. Of course, the test run fails. I then proceed to recode from these results.

Maybe I am too narrow on this respect, as I base my opinion on my experience only. It is frustrating to try to communicate and feel you are only presenting a monologue of your accomplishments.

I hope the team design approach catches on.

Celia Elena Mecks
Alameda, Calif.

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KNEE from page 45

available with an assortment of attachments and accessories. But unlike those devices, they are still usable as intended — namely, as a knee-topper. In the case of the knee-topper, components are neatly mounted along the leg from ankle to groin, using flesh-colored cables if short pants are worn; otherwise, they are color-coordinated to one's clothing — blue pinstripe for the New York IBMer, something in desert pastel for Silicon Valley folks and hot red for our New Orleans colleages. This makes each component appear to be working happily on its own, communicating with the others when required, mysteriously, as do bees.

Power supply

Power is supplied in a number of ways. Most common is the battery. For swimmers, this at first glance makes one fearful of knee-top usage — and no wonder. The early versions took many a luckless user straight to Davy Jones' locker. One scuba diver, playing Frogger on his knee-topper far under the sea to avoid the merciless kidding by adult sourpusses, was recently eaten by a great white shark as he flailed away in a hopeless attempt to outswim its jaws, all the while packing enough batteries to sink a battleship.

But we've come a long way since those days. Just consider today's inflatable batteries made by the Anton-Bauer Co. at its secret location somewhere. Designed to be strapped to the soles of the feet, these batteries provide enough buoyancy to enable a well-balanced swimmer to walk on water while his hands, hovering over his knee-topper, are typing his novel.

And these floatables, as we in the trade call them, are long lasting enough to outlive their user, so that a smooth transition to the next generation (of user) is assured, whichever way death may come.

You may wonder why I bring up the role batteries play in our aquatic community of knee-topper users. I wish to emphasize the fact that knee-toppers, friendly to users on land, to be sure, are equally friendly at sea, whether on it or in it. No one can make this claim about hand-held systems or top-of-the-lappers, not to speak of credit card or watch-size advocates who know these lack suitable power! I shall close the subject of batteries by merely pointing out that implants of long-life batteries can save tons of cash in cleaning and resewing bills.

In this day and age, I cannot envision an executive leaving home without some sort of computing device in his possession — be it of the credit card, wristwatch, hand-held, lap or knee-top variety. More likely, he will want to carry all, plus enough battery power to last throughout the trip.

Setting up shop

He will want to set up shop, say, aboard an airplane, to use his time productively. Tray table laden with users manuals, batteries neatly packed under the seat in front, a calculator in one hand, a lap computer where it's supposed to be and a knee-topper gartered to his thigh.

For extra long trips, a personal local-area network with ear-held controllers can tie these together, making him into a personal integrated services digital network (PISDN), one that fellow passengers or a stewardess can access if they wish to communicate with him. The fuss of disconnecting should he have to go to the loo should prove well worth the effort, especially when others look on, green with envy, as the knee-topper, with lights flashing to signal program operation, starts to spew out its results on an ankle printer on the way. Returning, fellow passengers will be more even impressed as disks, mounted on a calf and smoothly purring, provide gyroscopic stability to their bearer as he hops into his electronic harness to reconnect himself to his PISDN. People will know that he's no sloucher or bludger at work, at home, in the air, on land or at sea.

"I've got to get me one of them one of these days," mutters a nearby movie-watching, martini-drinking passenger. "Otherwise, what am I?"

Looking for your DBMS experiences

Data base management systems (DBMS) are rapidly becoming the rage of the age. Coming in all shapes and sizes, from small to huge, from micro to mainframe, the DBMS is one of the most widely used information management tools. *Computerworld's* September Special Report will focus on DBMS and offer a taste of the dif-

Software Concepts announces line for VM users

Software Concepts, Inc. has announced a line of software products for users of IBM's VM operating system.

The four products come under the name of VM-Extensions: VM-Switch, VM-Print, VM-Watch and VM-Power.

VM-Switch reportedly adds various functions and features to VM while increasing throughput a minimum of 15%. It allows for windowing up to 64 applications concurrently from a single terminal. It is priced at $5,000.

A companion product to VM-Switch is VM-Print, which is said to provide more effective utilization of printing resources while eliminating the need to dedicate printers to specific applications.

With VM-Print, any IBM-compatible printer can be used to print output from all users of VM/CMS as well as from IBM DOS or OS applications. VM-Print costs $3,000.

VM-Watch monitors and reports on critical areas of VM performance, such as virtual and working set requirements and paging activity. It costs $1,000.

VM-Power reportedly increases the usability of IBM systems power in the VM environment. It allows terminal users to access the power output queues for previewing reports before printing. Its price is $5,000.

Software Concepts is located at Suite 1450, 250 Piedmont Ave. N.E., Atlanta, Ga. 30308.

SOFTWARE & SERVICES

Oracle upgrades its DBMS with Version 4.0

By Jeffry Beeler
CW West Coast Bureau

MENLO PARK, Calif. — Oracle Corp. has enhanced its relational data base management system (DBMS) with an additional release that reportedly works two to 15 times faster than the company's existing products.

In addition to providing improved performance, Version 4.0 of Oracle's DBMS boasts several previously unavailable functional enhancements, including additional arithmetic features, improved string-manipulation capabilities and an export/import utility.

Like Oracle's previous DBMS products, Version 4.0 supports IBM's SQL and is compatible with IBM's SQL/DS and DB 2 systems. This compatibility with SQL/DS and DB 2, in turn, allows the latest release of the firm's DBMS to run equally well on different vendors' hardware, an Oracle spokeswoman said.

In its initial form, Oracle 4.0 will operate only with IBM VM/CMS mainframes, the AT&T 3B family of processors and Digital Equipment Corp. VAX-11 series machines running under VMS, the company said. By the third quarter of the year, however, Oracle will expand the DBMS' support to enable the system to operate with IBM MVS mainframes, VAX-11 CPUs running under Unix, the Hewlett-Packard Co. HP 9000 and Apollo Computer, Inc. Domain series processors.

Billed as the Oracle DBMS line's "performance release," Version 4.0 reportedly executes all data base functions at least twice as fast as its immediate predecessor, Version 3.0. At times, however, the enhanced system's edge in performance greatly exceeds 100%, Oracle claimed. When conducting data base searches involving multiple criteria, for example, Oracle 4.0 is said to outperform previous releases by up to fifteenfold.

The improved performance is partly due to acceleration of the system's indexing capabilities, a revision of some of its algorithms, an optimization of its kernel and changes in its buffer manager.

In a further effort to enhance its DBMS products, Oracle has furnished Version 4.0 with additional arithmetic features that reportedly allow users to compute standard deviations, square roots, variances and the largest or smallest numbers in lists.

Another added feature, the export/import utility, is said to allow users to remove information from the data base structures and transfer it into files all at once rather than one table at a time. The same procedure also reportedly works in reverse.

Ranging in price from $24,000 to $48,000, Oracle 4.0 is available for shipment immediately from Oracle at 3000 Sand Hill Road, Menlo Park, Calif. 94025.

■ Software Concepts, Inc. has released a line of utilities for IBM's VM operating system/**48**

■ Consumer Systems Corp. has enhanced its JCLflow, Test/IMS and Databasic packages for IBM mainframes/**49**

■ Data General Corp. has added an integrated package of decision support tools to its Comprehensive Electronic Office system/**49**

■ Prime Computer, Inc. has begun offering the Medusa line of computer-aided design and manufacturing software/**50**

INSIDE

Systems Software/**52**

The director's new MIS (a fairy tale)

SOFTLINE
Milt Bryce

Once upon a time there was an MIS director who was so fond of his computer that he spent all of his money on elegant equipment and software. He wasn't concerned with managing his information resources or solving the business problems of the company; he was computer-rich in equipment and boasted of his prowess with technology.

There was plenty of fun going on in the department where the MIS director lived. Programmers were allowed to play to their hearts' delight. Strangers were continually arriving to tour the director's facilities. But one day there came two swindlers. They said they were MIS gurus and could improve the productivity of the director's staff and reduce the backlog of user information requests. The MIS director found the swindlers hypnotic, especially when they promised to break the information bottleneck through sophisticated tools for software engineering. Not only were their tools and devices unusually attractive, but also the information systems produced from them had the peculiarity of being invisible to anyone who wasn't fit for his post or who was hopelessly stupid.

"I say! These must be wonderful tools," the MIS director thought. "If I had them, I would have the most advanced, state-of-the-art technology in the industry. Imagine what I could do with them. Yes, I must have all of them at once." And he paid a large sum of money to the swindlers to deliver their

See **TALE** page 52

Milt Bryce is president of M. Bryce & Associates, Inc. of Cincinnati. He extends his apologies to Hans Christian Andersen.

System/38 gets enhancements to graphics functions

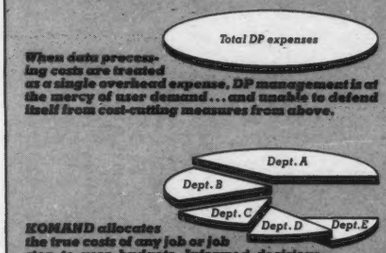
RYE BROOK, N.Y. — IBM has extended the graphics capabilities of its System/38 series of computers to include a variety of functions the vendor said were previously available only on IBM's Graphics Data Display Manager. The enhancements are provided in a new release of the System/38 operating system, which is provided without charge to current customers.

IBM also announced a number of other System/38 software enhancements. They include a capability to attach 3270-type terminals to the System/38, improvements in IBM's Office/38 applications programs, additional communications lines and PL/1 programming capabilities.

The new graphics facilities enable users to create diagrams and charts by drawing lines between any of the 138,240 addressable points on the IBM 5292 Model 2 color display, a spokesman said. An IBM 370-

See **IBM** page 50

OS/MVS-VS1 USERS: How to Distribute DP Expenses Equitably to User Budgets.



When data processing costs are treated as a single overhead expense, DP management is at the mercy of user demand... and unable to defend itself from cost-cutting measures from above.

KOMAND allocates the true costs of any job or job step to user budgets. Informed decisions can be made about cost vs. worth of DP use, and hardware needs can be justified.

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ONLINE ... AND ON TIME! Datapro has this to say about KOMAND: "All (interviewed) users unanimously agreed that the installation of KOMAND resulted in a dollar savings for their institutions." You should consider KOMAND for your OS/MVS environment. It's a modular system that allows you to choose only the components you need for now, adding others as your requirements grow. Call today for information and a free job accounting evaluator.

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Consumer Systems announces enhancements to OS, DOS 'JCLflow'

Consumer Systems Corp. has announced enhancements to the IBM OS and DOS versions of its JCLflow documentation package.

JCLflow is an application documentation program that automatically provides graphics system flowcharts, cross-reference reports and information management capabilities, according to the vendor spokesman.

JCLflow/DOS enhancements include a sort-exit review, a library interface for Phoenix Computer Corp.'s Condor program, alias program name support, disk label equate recognition, an extend symbol definition cross-reference report and a library interface.

JCLflow/OS enhancements reportedly include reformatting of job execution decks and support for parameter card retrieval from many separate parameter libraries. Price for both the OS and DOS versions is $7,500 for a perpetual license.

The vendor also has enhanced its Test/IMS package, which is a testing tool that provides diagnostic information on IBM IMS programs while testing within the native IMS environment.

Enhancements reportedly include IBM XA operating system support and multiple system coupling support. The package is priced at $21,000 for a perpetual license.

Additionally, the vendor's Databasic utility package, designed for use in creating, testing and maintaining IBM DL/I data bases, has been enhanced. The enhancements include random hierarchical sort and standard hierarchical sort. Its price is $24,000 for a perpetual license; a DOS version costs $15,000, the vendor said.

Consumer Systems is located at 1100 31st St., Downers Grove, Ill. 60515.

Functions

Report will focus on DBMS and offer a taste of the different available flavors.

The Special Report will look at the various kinds of DBMS, their power and their limitations. It will look at DBMS on mainframes and on micros and at data base machines and at how one fits or does not fit with the others.

The September Special Report will address such questions as: Is a DBMS really necessary? What new uses of DBMS are emerging? When should an installation consider using more than one DBMS? What are the advantages and disadvantages of running a DBMS on a separate machine?

Contributions to the Special Report should take one of two forms: a tutorial article, discussing an issue or trend, or an application story, outlining a particular user firm's experience with a DBMS.

Articles must be typed, double-spaced and can range in length from four to six pages. Artwork, such as charts, graphs and photographs, is welcome.

Authors should include a brief biography and a telephone number at which they can be reached.

The deadline for submissions to the Special Report is July 24.

If you have a story you would like to tell or any questions to ask, send them to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

Introdu
LinkTha

Today, you have to live in two different worlds. One belonging to IBM. The other to everyone else.

With that in mind, companies have come along with a variety of products that attempt to link the two together. But somewhere along the line, they all look a little dumb.

Enter the AVATAR PA1000™ Protocol Converter. It's the most intelligent way to bring personal computers, portable computers, or low-cost ASCII terminals into the IBM coaxial environment. For the first time, overburdened DP/MIS executives can look forward to truly smooth integration, minimal confusion, and fewer demands on their time. And users can get an affordable, easy-to-use way to tap the riches of their IBM mainframes.

So if you're looking for the best of both worlds, keep reading. And you'll see why the AVATAR PA1000 can out-think any product on the market.

First of all, the AVATAR PA1000 is an almost *universal* link. With no modification, it connects to virtually any personal or portable computer you have: IBM, Apple, DEC, TRS 80, Kaypro, COMPAQ, NCR, and others.

The AVATAR PA1000 also connects to the DEC VT100, IBM 3101, LSI ADM5, Televideo 910, ADDS Viewpoint or other compatible terminals.

The PA1000 connects coaxially to an IBM 3274/3276 cluster controller, so whatever personal computer or terminal you use will perform all the functions of an IBM 3278-2. The coaxial connection also means you won't be in for a future shock: ever-changing IBM protocols will be no problem.

	AVATAR PA1000 vs.	IRMALINE™
Easy to install	YES	YES
Q/A installation	YES	NO
English language commands	YES	NO
Help screens	YES	NO
Keyboard types	5	1
Remote dial-in/ security password	YES	YES
Dual host access	YES	NO
Local screen printout	YES	NO
3278 status line modes	3	1
Price	$995	$1395
Availability	Immediate	(?)

Two hosts are better than one. So in addition to the coax connection to IBM, the

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cing The t Thinks.

AVATAR PA1000 gives you an *extra* RS232 port. That gives you access to other local or remote asynchronous host computers or local printers.

HELP! If you need it (and who doesn't) you have help screens to put you back on track. The PA1000 also has easy-to-use, English language commands.

With a few simple keystrokes, you can switch from your IBM to the extra RS232 port, giving you access to private data networks and public databases like Dow Jones. And when you switch back, the AVATAR PA1000 is smart enough to *remember* your IBM screen.

In a distributed terminal network, remote dial-in from personal computers or asynchronous devices is increasingly important. You can dial into your PA1000 at the nearest cluster controller, and reduce communications costs dramatically in the process.

Just by typing "1-2-3" (how much simpler can you get?), the PA1000 *automatically* determines the baud rate of the attached device and is ready to go.

In just five minutes (no kidding) you can install the AVATAR PA1000. And you don't need to be a computer operator.

The AVATAR PA1000 even gives you a file transfer option that lets you transfer information back and forth between your personal computer and an IBM mainframe.

What will AVATAR think of next? The latest news is our PA1500, a link that lets you print the output from your IBM host on a low-cost ASCII printer. It supports high-speed dot-matrix, letter quality, and line printers. It's very simple to install. And it will save you a bundle.

To find out more about the AVATAR PA1000, our company, our distributors and dealers, or our plans, just call us. In Canada or Massachusetts: 617-435-6872. Everywhere else:

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Functions added to CEO

WESTBORO, Mass. — Data General Corp. has announced a decision support package that is said to be fully integrated with its Comprehensive Electronic Office (CEO) office automation system.

The CEO Decision Base consists of a personal data base, a spreadsheet tool, a report writer and charting tool. The data base reportedly enables the user to define, create and manipulate data files.

All of its spreadsheets, data tables, reports and charts are stored in the CEO filing system. All of these tools may be edited, viewed, mailed, printed and read by using the same menu choices as for word processing documents.

The program runs on DG's entire line of Eclipse MV/ Family systems and Desktop Generation models and is supported by DG's AOS, AOS/VS and AOS/WS operating systems.

An initial license for the AOS/VS version is $8,500, and the AOS version is priced at $6,000.

DG is located at 4400 Computer Drive, Westboro, Mass. 01581.

NEW LIFE FOR *1401* PROGRAMS

CS-TRAN converts your 1401 *object* programs to COBOL for the mainframe or mini of your choice.

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SOFTWARE & SERVICES

Prime claims commitment to CAD/CAM with 'Medusa' offering

NATICK, Mass. — Prime Computer, Inc. has announced that Prime Medusa has joined the family of integrated end-to-end software supported by Prime.

The company said that this move is intended to underscore its commitment to a computer-aided design and manufacturing (CAD/CAM) modeling system compatible with the company's 50 series.

Prime also announced the Medusa AEC-Architectural Design module, to be available in August.

The new module is designed to expand capabilities of Prime's current CAD/CAM products, featuring architectural symbol libraries, menus, layering convention, dimensioning package and design programs, according to Prime.

Medusa pact

Prime recently signed an agreement with Computervision Corp. for joint ownership and marketing rights to Medusa, according to a spokeswoman for Prime.

The software was developed by Cambridge Interactive Systems of Cambridge, England. Prime had an agreement with the British firm in 1981 to market the software, but Cambridge Interactive was acquired by Computervision in 1983, the spokeswoman said.

The Prime Medusa two-dimensional Design Drafting module is used for layouts and schematics and detailing tasks in mechanical, electrical, structural, architectural and electronic applications, the company spokeswoman said.

Module offerings

The module makes it possible to design three-dimensional objects with the added capabilities of removing hidden lines, shading models and calculating mass property data, according to the vendor.

The Design Drafting module is priced at $10,000, the vendor said. A bundled configuration, including a Prime 2550 CPU, with a 315M-byte disk, a tape drive, 2M bytes of memory, two PW150 workstations and software, is priced at approximately $200,000.

Prime Computer is located at Prime Park, Natick, Mass. 01760.

THE PRINTER TO PICK WHEN THE PACE QUICKENS.

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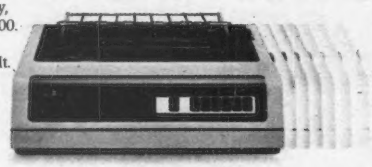

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IBM from page 47

compatible program called Graphics Data File has also been added, permitting the System/38 to exchange graphics with another System/38 or with a 370, 4300 series or 3080 series machine. New presentation graphics routines enable any user-written application to create a variety of charts on one screen, IBM said.

IBM also introduced a simplified graphics capability called the Office/38 Business Graphics Utility (BGU), which enables a customer to create eight types of charts using menus and prompts. BGU has a one-time charge of $2,000 and a Distributed Service License Option (DSLO) of $1,760.

Under the new terminal attachment facility, IBM 3270 terminals can be attached to the System/38 via an IBM 3274 control unit.

Enhancements to Office/38 include proofreading aids and language dictionaries for Spanish (350,000 words) and English (366,000 words). The one-time charge for each of the two dictionaries is $195. New Office/38 functions include dynamic switching between functions, display of a user's office jobs and calendar management.

The System/38 will now support up to 12 communications lines, including Synchronous Data Link Control or Binary Synchronous Communications. The purchase price is $780 for the communications attachment plus $3,040 for communications control. PL/I support costs $9,800; a DSLO costs $8,624. The basic monthly charge is $490, or $431 for a DSLO.

IBM's Information Systems Group is at 900 King St., Rye Brook, N.Y. 10573.

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TALE from page 47

tools as fast as possible.

And so it came to pass that the tools were spread throughout the department — fourth- and fifth-generation languages, program generators, prototyping aids, data dictionaries, data base management systems, information centers and personal computers. The technology also spread quickly to other parts of the company, where users had access to them. And the machine cycles whirled, much to the delight of the hardware vendor.

"Well, now, I wonder how everything is going?" the MIS director said to himself. But there was one point that made him feel rather anxious, namely, that a man who was stupid or quite unfit for his post would never be able to see the information system that had been produced. Not that he, the MIS director, need have any fears for himself — he was quite confident about that — but all the same, it might be better to send someone else first, to find out how things were going.

"I'll send my honest old systems programmer for a demonstration of the consultants' tools," the MIS director thought. "He's the best one to see what the stuff looks like, for he has plenty of sense, and nobody fills his post better than he does."

So off went the honest old systems programmer to the workshop where the two swindlers sat busy at their terminals. "Lord, bless my soul!" thought the systems programmer, with eyes staring out of his head. "Why, I can't see anything!" But he was careful not to say so.

The two swindlers begged him to take a closer look — didn't he find the design most attractive? Then they pointed to the terminal, but, although the poor old systems programmer opened his eyes wider and wider, he couldn't see a thing, for there wasn't a thing to see. "Good Lord!" he thought, "Is it possible that I'm stupid? I never suspected that, and not a soul must hear of it."

"Well, what do you think of it?" one of the swindlers asked.

"Oh, it's elegant! Quite sophisticated!" the old systems programmer said, looking through his spectacles. "I shall certainly tell the MIS director how pleased I am with it."

By and by, the MIS director sent another honest technician to see how the technology was working in the company. The swindlers accompanied him on his journey. As they traveled throughout the company, the gurus made sure that the technician saw only what they wanted him to see. He saw programmers generating software and prototyping systems; he saw users developing their programs and files, all at a high rate of speed. The swindlers were quick to point out how fast things were happening and marveled at their tools.

"But the software that is being designed doesn't satisfy any information needs and is making us dependent on our hardware more than ever," the technician thought to himself. "And the users are building systems that do not communicate with other systems through a shared data base. I know that I'm not stupid, but if I say that there is no management control here, then people will think I'm not fit for my position." And then he praised the tools, which he knew were compounding problems for the company. "Yes, it's quite sophisticated," he said to the MIS director when he got back.

The splendid tools became the talk of the town. And now the MIS director himself said that he must try the new tools. Quite a throng of select people, including the two honest old technicians, went with him to where the crafty swindlers were demonstrating the latest technology.

"Look, isn't it magnificent!" the two honest technicians said, as they gazed upon the terminals.

"What's this?" the MIS director thought. "I don't understand a thing — this is appalling! Am I stupid? Am I not fit to be MIS director? This is the most terrible thing that could happen to me . . ."

"Oh, it's quite wonderful," he said to them. "It has our most gracious approval." And he gave a satisfied nod. All the courtiers who had come with him looked and looked, but they made no more of it than the rest. Still, they all said just what the MIS director said, and they advised him to demonstrate the devices for the first time at the corporate executive meeting that was to take place shortly.

On the eve of the meeting, the swindlers sat up all night trying to prepare for the critical demonstration.

Then the MIS director went to the corporate executive meeting with the gurus and explained the new tools with great delight. The swindlers put on a demonstration that startled the executives. Not wanting to appear unfit for their positions or to seem stupid, they all praised the MIS director for the unbelievable technology. "Marvelous! Sensational!" they all said. Never had the MIS director's technology been such a success.

"But you still haven't solved your problems!" a visiting consultant said. "You've only attacked the symptoms. Your user backlog hasn't been reduced; in fact, it has been lengthened. You haven't improved productivity. Your people still are not addressing the critical business systems problems of your company. You are still not applying any management control over your environment. You've only compounded the problem by adding a lot of overhead that is creating financial losses for your company. No amount of elegant technology will solve your problems — only management will."

"Goodness gracious, do you hear what he is saying?" the executives whispered from one to the other. Then they all shouted, "But you still haven't solved our problems!" And the MIS director felt most uncomfortable, for it seemed to him that the executives were right. But somehow he thought to himself, "I must go through with it now. I have too much invested in it already." And so he drew himself up still more proudly, while his swindler gurus chased after him with more new ideas, for they had found an endless source of revenue, even in spite of the obvious.

SYSTEMS SOFTWARE

PRODUCTIVE SOFTWARE SYSTEMS, INC.
Robot/3000 Auditor

Productive Software Systems, Inc. has announced a package to track the occurrence of disk file changes on Hewlett-Packard Co.'s HP 3000 computer.

The Robot/3000 Auditor maintains a data base of which files have been changed, when they were changed, who changed them and how many records were altered, according to a spokesman from Productive Software.

The Auditor also will track the growth of data base entries and can report what files have been purged from the disk, according to the vendor spokesman.

The product is menu-driven. In addition, the Auditor features an online Help system, the vendor spokesman said.

Price of the Robot/3000 Auditor is $1,500 for a single-CPU, one-time, perpetual license, according to Productive Software Systems.

Multiple-CPU discounts are available from the firm, the spokesman said.

Productive Software Systems, 5617 Countryside Road, Edina, Minn. 55436.

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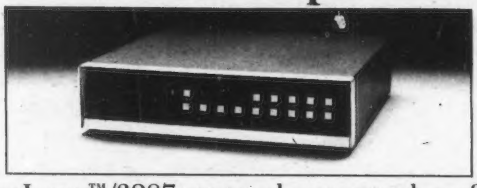

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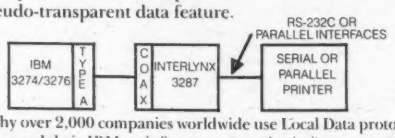

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COMMUNICATIONS

Shawmut to offer on-line banking services

Feasibility for small business, individual accounts shown in test program

By James Connolly
CW Staff

BOSTON — After a two-year pilot program with 100 customers participating, Shawmut Corp. last week announced an on-line banking system here that will allow individuals and small businesses to do their banking using most types of personal computers.

Arrive and Business Arrive reportedly allow customers with any Ascii terminal or computer to access their Shawmut accounts through Compuserve, Inc.'s public data base and to transfer funds, check account balances and obtain information about bank services.

Shawmut, which claims to be the first New England bank to offer home banking, reportedly is one of the few U.S. banks offering such a service to small business accounts, in addition to individual accounts.

Businesses with sales of under $5 million will be able to get information on account balances, investment accounts, account activity and account transfers, according to bank spokeswoman Janet Pruitt. Unlike individual customers, businesses cannot use the service to pay bills, Pruitt said.

Individuals can send payments to more than 5,000 companies nationwide, although the electronic payment must still work its way through the clearing system just as most checks are processed.

Businesses can't use electronic bill paying because the system won't accommodate the volume of invoice numbers that accompany business payments, said Pruitt, who noted that the bank "would like to get into" business payments.

The 100 pilot program participants, including an unspecified number of businesses and about 50 Shawmut employees, are now using the system, which will be available to all customers on August 1, Pruitt said. She said the bank hopes to have 2,000 participants by the end of the first year of general operation.

Shawmut Corp. President John P. Hamill reported that the successful results of the bank's pilot studies during the past year indicated customer satisfaction with the service. "Pilot program participants cited the convenience of the account statement and bill payment features as key bonuses to personal computer banking. In particular, they appreciated the ability to schedule the payment of bills before their actual due dates."

Once a customer signs up for Arrive or Business Arrive, they access the system through either 300 or 1,200 bit/sec modems, dialing a local Compuserve number. According to Pruitt, Shawmut transmits to the Compuserve data base daily updates on Arrive customer accounts and receives from Compuserve reports on customer transactions.

Pruitt said the only software a customer needs to use for Arrive is the general communications package needed for accessing any public data base.

She noted that Arrive differs from some banking systems now being tested in other parts of the U.S., in that it uses text rather than the graphics of videotex-based systems.

Service fees are $8 for Arrive, $35 for Business Arrive. Access time is extra, ranging from $7.50 to $18/hour, depending on the modem speed and time of day.

INSIDE

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More work needed to make Ansi useful

DATA STREAM
John Dix
CW Senior Editor

Many factors hinder the ability of computer systems of different makes to interact freely. At the lowest level, for example, a limiting factor can simply be differences in the physical plugs or interfaces used for wire connections between devices.

One of the early efforts to ensure sensible communications between computer devices was the standardization of transmission codes. The American National Standards Institute (Ansi) created one such transmission code when, in 1962, it finalized the American Standard Code for Information Interchange, more popularly known as Ascii.

This code is composed of 128 characters, 96 of which specify the order of binary 1s and 0s used to represent things such as punctuation marks, the alphabet and numbers. Some of the remaining characters are used as control characters. Advances in peripheral technology, however, have gone beyond what is specified in Ascii and have hobbled the standard as an effective means to ensure sensible communications between devices.

In particular, Ascii has fallen down in its ability to provide for additional control functions needed in new terminal and printer technology. To make up for the gap, manufacturers have written in their own commands, widening the incompatibility hiatus between their product lines.

See ANSI page 55

Local-area net introduced by Pragmatronix

BOULDER, Colo. — Pragmatronics, Inc. recently introduced a local-area network that is said to be a commercial version of the U.S. National Bureau of Standards (NBS) NBSNET, which was developed to provide local-area net services for NBS' own variety of terminals, computers, word processors and other peripherals.

Tienet is said to be a vendor-independent baseband carrier-sense multiple-access with collision detection (CSMA/CD) local network that operates at an aggregated data rate of 1M bit/sec.

According to the vendor, Tienet can interconnect 5,000 user stations at rates as high as 19.2 bit/sec and supports a maximum of 24,000 station connections. It is said to support layers one, two and three of the International Standards Organization's Open System Interconnection (OSI) model and to provide partial services in OSI layers four, five and six.

A two-mile long Tienet cable segment can reportedly support 1,600 users, supporting station data rates up to 9.6K bit/sec for terminals and 19.2K bit/sec for computers. One hundred stations can transmit nearly simultaneously at 9.6K bit/sec, according to the company.

Tienet is said to feature fully distributed network control, eliminating the need for a central computer and providing for the network's cost to be proportional to the number of connected stations. The distributed control and bus topology of the central cable were designed to provide system immunity from failures and ensure that the failure of one station does not prevent network use by other users.

Tienet is priced from $696 per station connection for 200 stations to $910 per station connection for 12 stations.

Additional information is available from Pragmatronics, which is located at 2015 10th St., Boulder, Colo. 80302.

Western Union shows CXC's PBX

WASHINGTON, D.C. — Western Union, Inc.'s Government Systems Division recently demonstrated a configuration of CXC Corp.'s Rose private branch exchange (PBX) supporting seven different types of data terminals, facsimile machines and computers.

Western Union, which is an OEM for the Rose from CXC, is offering the value-added version of the PBX under the name Vega and marketing it to U.S. government agencies.

In a demonstration at the Armed Forces Communications and Electronics Association show here, Western Union linked personal computers from IBM, Wang Laboratories, Inc., Sperry Corp., Digital Equipment Corp. and Compaq Computer Corp., as well as an AT&T teletypewriter terminal and a Ricoh of America facsimile machine.

A Western Union spokesman said the connection involved slight modifications to the operating systems of the computers to facilitate file transfers, but involved no changes to the Rose.

The Western Union spokesman said the basic product being offered to the government is the Rose exchange, with the added capability of using the government's Autovon worldwide voice system and a protocol converter allowing IBM 3270-type terminals to communicate without a host computer's intervention. The system reportedly features the ability to carry simultaneous high-speed voice conversations, text messages and data communications.

Western Union plans to deliver Vega in mid-July.

COMMUNICATIONS

VOICE/DATA CONTROL

FIBRONICS INTERNATIONAL, INC.
Model FM1699

Fibronics International, Inc. has announced a fixed, eight-port coaxial multiplexer designed for use with Memorex Corp. controllers and IBM 3274/A local and remote control units.

The Model FM1699 is said to operate with the Memorex 2074 controller and all Memorex category A peripherals. It reportedly connects any eight ports from a Memorex or 3274/A controller to communicate a distance of 4,000 feet over a standard RG 62 A/U coaxial cable.

At the peripheral side, it is said to connect the sole coaxial cable and allow up to eight peripherals to be served.

Available immediately, the Model FM1699 costs $2,200 per pair.

Fibronics International, 325 Stevens St., Hyannis, Mass. 02601.

MULTIPLEXERS/MODEMS

COMPLEXX SYSTEMS, INC.
Trimux.212

Complexx Systems, Inc. has announced a three-channel switching statistical multiplexer designed for three distinct modes of operation.

The Trimux.212, targeted at small users, has a built-in AT&T 212A-compatible modem, the company said.

It is said to allow up to three devices to communicate simultaneously with three devices in another location over a single switched line.

When not being used as a multiplexer, it can operate in its second mode, which enables any one of the attached devices to use the multiplexer's internal 1,200 bit/sec modem.

In its third mode, the device acts as a data switch to allow three locally attached devices, such as two personal computers and a printer, to communicate.

Available immediately, Trimux.212 costs $1,495.

Complexx Systems, 4930 Research Drive, Huntsville, Ala. 35805.

LOCAL-AREA NETWORKS

UNGERMANN-BASS, INC.
Personal Network Interface Controller

Ungermann-Bass, Inc. has introduced a network interface controller for connecting IBM Personal Computers and IBM compatibles to its Net/One local-area network.

Personal Network Interface Controller (Personal NIC) reportedly is a plug-in board designed to provide Personal Computer users the same capabilities as the Ungermann-Bass Personal Network Interface Unit, but for less money.

The Personal NIC costs $595 or $750 when equipped with an optional on-board transceiver for use with thin coaxial-cable baseband, according to the vendor.

Ungermann-Bass, 2560 Mission College Blvd., Santa Clara, Calif. 95050.

AUXILIARY EQUIPMENT

LIBERTY ELECTRONICS CO.
Freedom 212

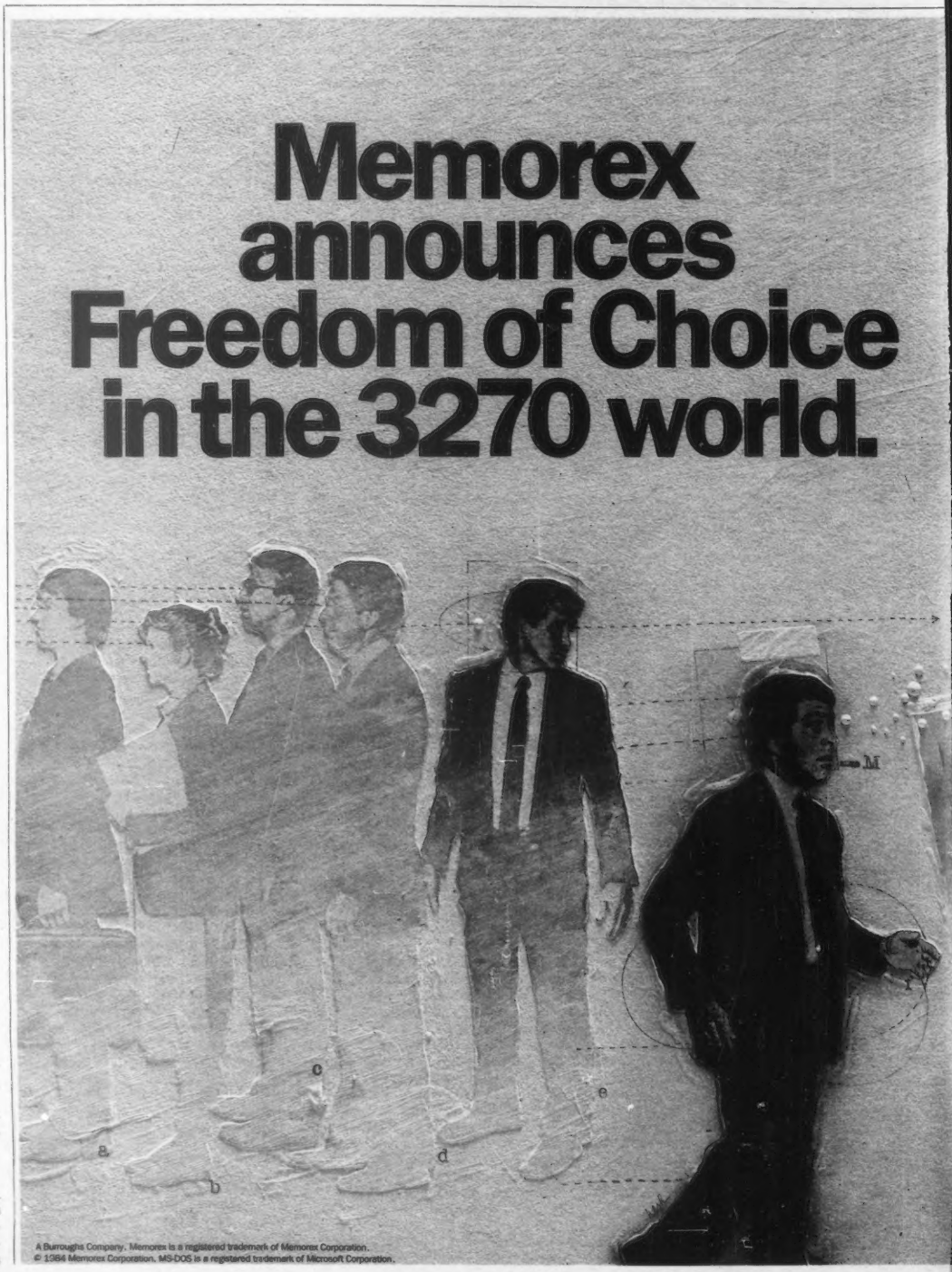
Liberty Electronics Co. has introduced its Freedom 212 remote information station, designed to operate as a stand-alone terminal, as a VDT and modem, as a stand-alone modem or as a display telephone.

Its features are said to include advanced terminal capabilities, a full-size tilt-and-swivel display, full-size 106-key keyboard with 47 programmable nonvolatile keys, an integral AT&T 212A-compatible modem, a built-in 25-line telephone directory and an automatic dialer, the vendor said.

According to the company, it is designed with single-keystroke operation, diagnostics and a Help function. It is installed by plugging a telephone into the RJ11 jack on the Freedom 212 and plugging the Freedom 212 into the wall jack.

Volume shipments are scheduled for August. It costs $1,295.

Liberty Electronics, 625 Third St., San Francisco, Calif. 94107.



COMMUNICATIONS

MEGABIT COMMUNICATIONS, INC. MBX-2501

Megabit Communications, Inc. has introduced a channel extender designed to provide communications among IBM mainframes and high-speed peripherals.

The MBX-2501 is said to provide two-way, host-to-peripheral data communications at the standard block multiplexer channel speed of 10M bit/sec for a distance of up to 2,000 feet.

According to the spokesman for the company, the channel extender is transparent to the computer and the peripheral devices and requires no change to systems software.

The MBX-2501 operates over both coaxial and fiber-optic cable and enables the remote location of plotters, printers, communications controllers, tape drives and other devices in alternate locations, the vendor spokesman said.

The MBX-2501 channel extender consists of two self-powered controllers designed to be plug-compatible with standard IBM connectors. A two-controller backup unit is part of the standard package, the spokesman for the vendor said.

It is available now for $60,000, according to the vendor.

Megabit Communications, 90 W. County Road, St. Paul, Minn. 55117.

ANSI from page 53

To address these needs, Ansi's X3L2 committee on character sets and codes released a standard called Additional Controls for Use With Ascii-X3.64, 1979, otherwise known simply as Ansi, or Ansi X3.64.

"Ascii is the alphabet and Ansi is like the vocabulary," said Steve Tatum, vice-president of marketing and sales for the CRT division of Televideo Systems, Inc. "Ansi addresses the specific features that a product does, providing a standard for the commands a maunfacturer uses to cause things like reverse video, underline, send character, character delete . . . all the functionality of the device."

Gone unnoticed for some time after its introduction, Tatum said that interest in Ansi compatibility blossomed last year. Ed Washington, a senior industry analyst with Dataquest, Inc., a market research firm in San Jose, Calif., confirmed that interest in Ansi is mounting. His company tracks vendors that conform to Ansi. That list now includes mini makers Digital Equipment Corp., Hewlett-Packard Co., Data General Corp. and terminal manufacturers Televideo Systems, Inc., Lear Sieglar, Inc., CIE Terminals, Inc. and Visual Technology, Inc.

One problem

But there's one problem.

Not all of these vendors have conformed to the same parts of the standard, leaving their products incompatible.

Ansi X3.64 still has some growing up to do. "Right now it is just a shopping list of control functions designed for lots of different kinds of terminals and printers," said Thomas N. Hastings, a DEC consultant engineer and acting chairman of the standards institute's X3L2 committee that developed the standard.

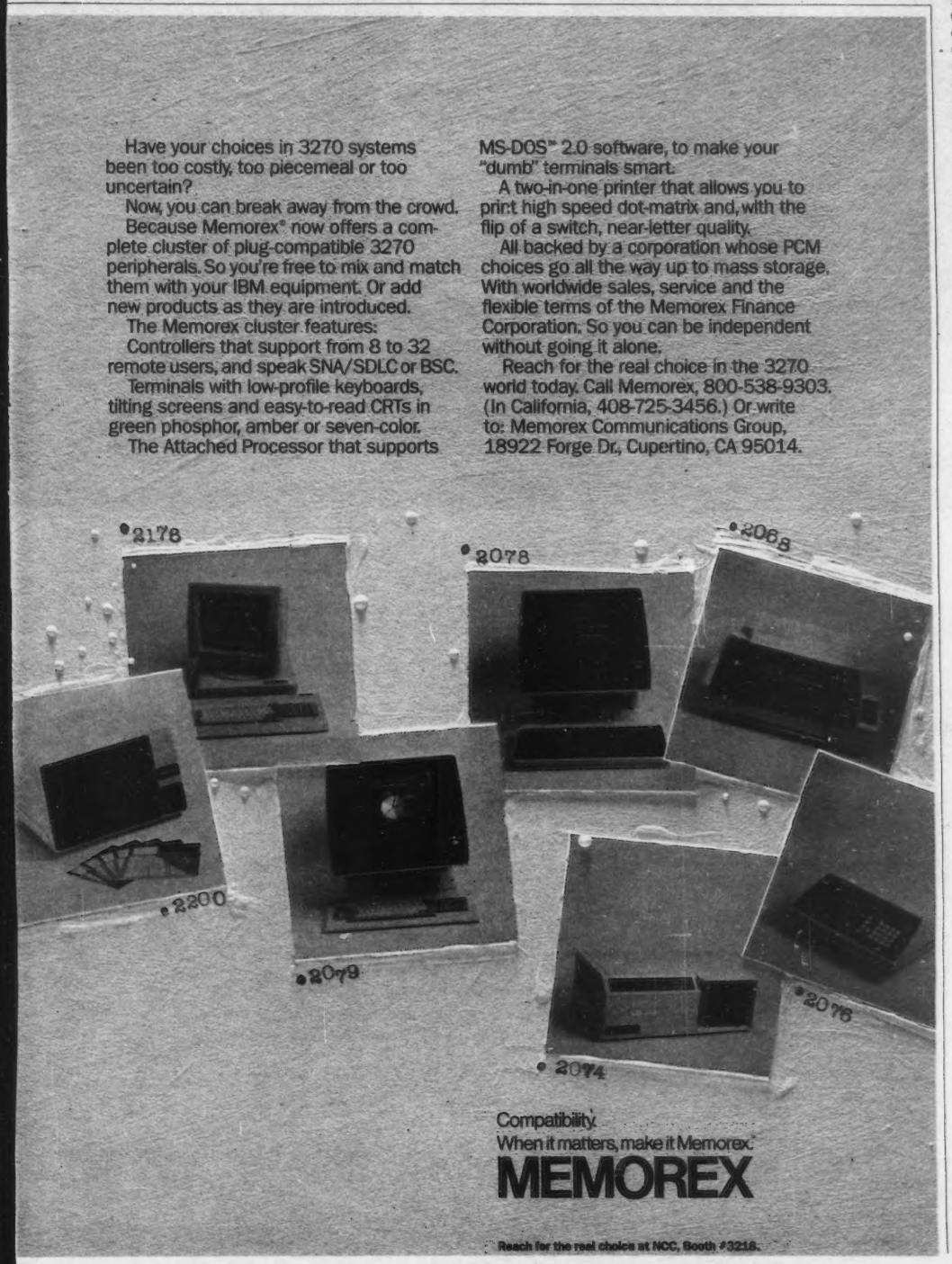
From the outset, it was never expected that anyone would implement all of the standard, Hastings noted. As a list of control options, manufacturers could choose to support various portions of the standard that directly pertained to their products, such as video terminals or printers. "So, even though this standard exists," Hasting's said, "every manufacturer defines subsets of the standard [for their use] differently."

Means nothing

As it stands, then, Ansi X3.64 compatibility means nothing if it is not specifically known which parts of the standard have been adhered to by the vendor.

"What we need now," Hastings said, "is to define subsets of the standard." These subsets will define the controls as used with, for example, interactive video terminals or laser printers, and make the standard much more useful. Efforts to do this are not very far along. "We need more people to help define these subsectors," the chairman maintained.

Individuals interested in helping to define the standard further can get in touch with Hastings at DEC, Mail Stop ML 5-3/E12, 146 Main St., Maynard, Mass. 01754.



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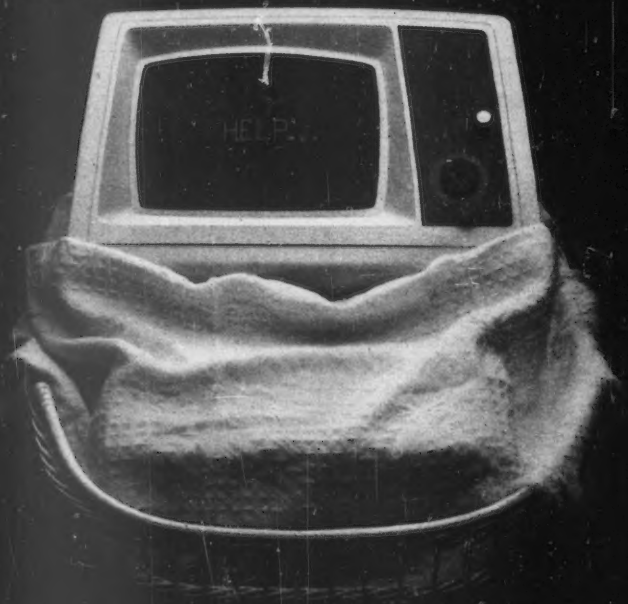

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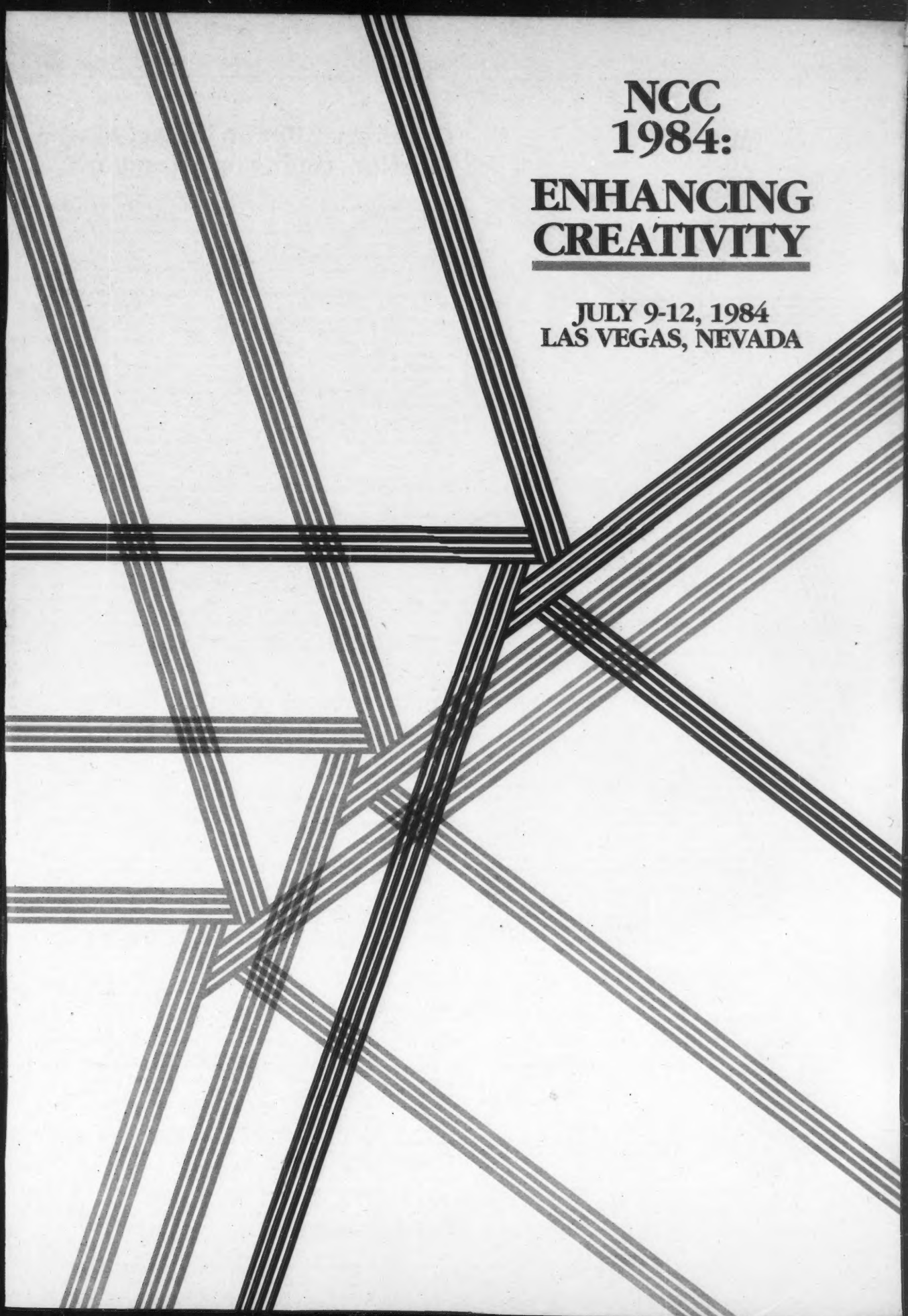
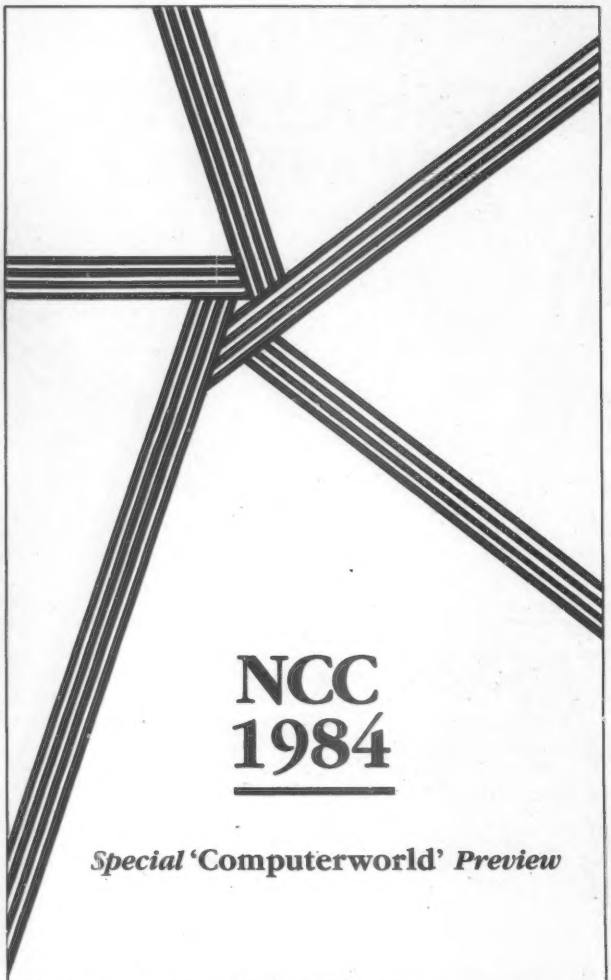
JULY 9-12, 1984
LAS VEGAS, NEVADA





Special 'Computerworld' *Preview*

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Opinions differ on impact of location, timing on attendance

By Jeffry Beeler
CW West Coast Bureau

Opinions vary widely on the question of whether the location and timing of this year's National Computer Conference will seriously discourage attendance.

From some sources, the controversial decision to hold NCC '84 in Las Vegas in July draws expressions of dismay and dire predictions of a comparatively paltry turnout.

Other sources, however, take the opposite view and expect the conference's sweltering setting to have little, if any, impact on the final registration tally.

Skeptics

Included in the first group of industry observers are skeptics like Harvey Hartman, senior vice-president of sales and marketing at Molecular Computer, Inc.; and Robert Hufnagel, vice-president of marketing at Callan Data Systems, Inc.

Hartman categorized as "incredible" the decision to conduct this year's NCC during the middle of a Las Vegas summer and foresees the possibility of disappointingly low attendance. At the very least, he predicted, the choice of date and location "certainly won't help matters any."

Similar observations came from Hufnagel, who stopped short of forecasting a low head count at NCC, but voiced serious doubts that the selection of Las Vegas as the show site will "have a positive effect" on registration.

On the other side of the issue stand industry observers like Joe Rizzi, president of Elxsi, Inc., an exhibitor at NCC '83, but a no-show at this year's conference.

"My feeling is that companies will go anywhere — absolutely anywhere — they think they can sell their products, even if the location is Las Vegas or Montana or Albuquerque," Rizzi said. "I know that's the attitude here within my own company."

Why, then, did Elxsi decide to bypass NCC '84? The answer has less to do with misgivings about the conference's location than with fears of probable overcrowding and doubts that the benefits of participation would justify the high costs.

"For us, the decision to hold this year's NCC in Las Vegas was never a serious barrier to attendance," Rizzi said. "In fact, if anything, Las Vegas is probably much better suited to handling large gatherings than most other spots."

On the other hand, he added, "the conference has become so big and the industry has become so segmented that we felt we stood little chance of getting our money's worth" from this year's NCC.

Temperatures over 100°F may greet NCC visitors in Las Vegas

By Edward Warner
CW Staff

How hot will it be in Las Vegas next week?

Well, air conditioners have been "selling real good" at the Sears, Roebuck & Co. store here lately, according to salesman Ray Guteriz.

There is a reason.

Late last month, Las Vegas endured a period of about 10 days of 100 F temperatures, a heat wave that ended with the arrival of what Guteriz called "cooler weather" — daytime readings in the 80s and 90s.

Now, three-digit temperatures may seem a bit warm to an Easterner or a Midwesterner, but to a 27-year veteran of Las Vegas weather like bookkeeper Deloris Westfall, "the weather in July [here] is beautiful." Westfall, it should be noted, works for an air conditioner service company.

What's the weather there like in July, Deloris?

"You can expect hot, hot, hot — and rain, rain, rain," she said. The rain is due to the sudden flash floods that have been known to inundate this desert area. Though Las Vegas gets only five inches of rain a year, that five inches tends to fall rather suddenly.

But it is heat and the lack, not surfeit, of water with which a visitor to Las Vegas usually has to be concerned, according to Las Vegas County Health Department Health Educator Jeanne Palmer. The temperature in July in the city is usually over 100, she said, and that means "it would be best not to spend a lot of time outdoors."

Palmer advised visitors to stay indoors during the early afternoon and never exercise outside when the temperature breaks 90. When one must venture outside, it is best to rub on some sunscreen and wear a hat, she said.

It's not for nothing that 10-gallon Stetsons are still popular in Nevada.

For a scientific view, meteorologist Ken Bergman of the National Weather Service's Climate Analysis Center in Maryland said that it is likely that the average daily highs in Las Vegas during National Computer Conference week will range from 95 to 110, and the lows, for lack of a better word, will be in the 75 to 80 range. The reason, he said, is because "a lot of solar heating will occur over an arid landscape."

Arid is right. Bergman said the average normal precipitation in Las Vegas in July is 0.45 inches and that less than five inches falls in any year. Boston, by comparison, gets three inches in July alone. Translated to humidity, that means a low of 14% in Las Vegas in mid-afternoon, he noted.

The low humidity can make the heat more acceptable for visitors, he said, because "100 out there is much more comfortable than 90 in Boston."

Bergman said the Weather Service could not predict exact temperatures for July 9 through 13 in Las Vegas

See **HEAT** Preview/4

NCC to focus on theme of 'Enhancing Creativity'

By John Desmond
CW Staff

Advances in communications technology that have made computer power more available to the individual inspired this year's National Computer Conference theme of "Enhancing Creativity."

Beginning next Monday at the Las Vegas Convention Center and Hilton Hotel, NCC '84 will feature 650 exhibitors spread over 380,000 square feet of floor space. While the average outside temperature in Las Vegas in July is 100 degrees Fahrenheit, humidity is usually close to zero and the center's air conditioning is said to be more than adequate.

"We called in an air conditioning consultant, and it is above required capacity," Ann-Marie Bartels said of the system. Bartels is a spokeswoman for the American Federation of Information Processing Societies, Inc. (Afips), chief sponsor of NCC. Las Vegas was chosen for the 1984 convention because, "We needed to move into a larger facility," and the Convention Center was the only available space, Bartels said.

Along with Afips, the Association for Computing Machinery, the Data Processing Management Association, the IEEE Computer Society and the Society for Computer Simulation are sponsoring the event.

Over 90 technical sessions in 10 tracks are scheduled, as well as 18 Professional Development Seminars. Conference Chairman Russell K. Brown and Program Chairman Dennis J. Frailey, Afips staff and many volunteers have spent two years organizing the event.

The 10 tracks of the technical program focus on hardware and architecture, computer communications, the automated office, information processing management, data base management, artificial intelligence, computer graphics and entertainment, educational and societal issues, personal computers and software.

In a slight scheduling change from last year, the exhibit hours will be 10 a.m to 5 p.m. Monday and 9 a.m. to 5 p.m. Tuesday through Thursday, pushed forward an hour from the usual 10 a.m. to 6 p.m. exhibit schedule. The change was made "to take advantage of cooler temperatures in the early morning," Bartels said.

The 14 full-day and four half-day Professional Development Seminars will be held at Caesars Palace, which can be reached by shuttle bus from the Convention Center. The seminar program topics include systems development, data base technology, networking, planning and cost-effective computer use. The seminars cost $75 for a full day and $45 for a half day.

The keynote address will be delivered Monday at 9:30 a.m. by John F. Akers, president of IBM. The speech is titled "Trends in Information Processing." Akers is expected to examine computer industry opportunities and responsibilities and trends in information processing.

The Harry Goode Memorial Award, established in 1964 to honor outstanding contributions to the information processing field, will be presented at the Monday keynote session. The recipient is traditionally not announced until Monday. Other awards are the Distinguished Service Award, established in 1970, and the Education Award, established in 1983, also to be bestowed during the keynote session.

The contributions of the Lawrence Livermore National Laboratory to the industry will be recognized in two sessions on Pioneer Day, Wednesday. The first session, "Lawrence Livermore Laboratory — The Early Years," to begin at 1:30 p.m., will focus on the beginnings of the laboratory and the necessity for computers in conducting its work. Opening the discussion will be Duane Sewell, who was deputy director of the laboratory before being appointed assistant secretary of energy for defense programs under the Carter administration.

The second Pioneer Day session, "The Octopus System," will begin at 3:20 p.m. and will focus on the laboratory's Octopus network and the hardware/software problems encountered in implementation of the network. Pioneer Day panel discussions will focus on acquiring early systems for the lab and early hardware and software developments.

NCC '84 will also include:

- The Film Forum, featuring films and videotapes of advancements in micro-technology, aerospace, computer-aided design and manufacturing and DP management.
- An Early Bird reception for conference attendees on Sunday from 6-8 p.m. in the Gold Room at the Las Vegas Convention Center Rotunda.
- A career planning workshop, "Plotting Your Computer Career," on Sunday from 1-4:30 p.m. at the Las Vegas Convention Center. Herb Safford of GTE Data Services, Inc. will moderate a panel of industry and university experts.
- An international visitors center in the Rotunda Balcony at the Convention Center, where Spanish, French, German, Japanese and Chinese interpreters will be on hand. A message center and information on local services will be available.

On-site registration times set

The registration fee for the National Computer Conference is $125 for those attendees registering on-site.

Registration hours at the Las Vegas Convention Center and at Caesars Palace are 10 a.m. to 6 p.m. Saturday and Sunday, July 6-7, and 7:30 a.m. to 5 p.m. Monday through Thursday.

Early NCC attendees are invited to join the Early Bird reception on Sunday from 6 to 8 p.m. in the Gold Room at the Convention Center rotunda. Attendees should bring their badges.

Afips, volunteers forces behind NCC

The 1984 National Computer Conference that will be held Monday through Thursday at the Las Vegas Convention Center and Hilton Hotel is sponsored by the American Federation of Information Processing Societies, Inc. (Afips) and four of its member organizations and is orchestrated by over 1,000 volunteers.

The head of the NCC '84 steering committee is Conference Chairman Russell K. Brown, a financial and management consultant and president of Benchmark Services, Inc.

The NCC '84 computer conference program chairman is Dennis Frailey, senior staff specialist in business development with Texas Instruments, Inc.

The NCC '84 vice-chairman is W.J. Carlisle, an assistant vice-president with Bell Communications Research, Inc.

The 18 half- and full-day seminars to be presented at NCC '84 were coordinated by Lawry McKee, Professional Development Seminar chairman. McKee is a lead engineer with Singer Co.'s Link Flight Simulation Division in Houston.

Afips is a federation with 11 constituent societies engaged in the design and/or application of computers and information processing systems. Dedicated to nonprofit scientific and educational purposes, the federation acts on behalf of the societies in carrying out programs designed to advance the information processing industry.

The other four sponsoring organizations are the Association for Computing Machinery, the Data Processing Management Association, the Institute of Electrical and Electronics Engineers Computer Society and the Society for Computer Simulation.

IBM's Akers to make keynote address

By Peter Bartolik
CW Staff

As keynote speaker at this year's National Computer Conference, John F. Akers is making only his third public address as IBM president.

Akers was named president of IBM in February 1983 at the age of 48. During the first year of his tenure, Akers remained out of the public eye, as he spent that time becoming more familiar with IBM's vast international operations.

Akers

The subject of Akers' speech, which will be given next Monday morning at 9:30 a.m. during the opening session of NCC '84, will be "Trends in Information Processing." Details of the speech were not available ahead of time, but Akers reportedly will examine the opportunities and responsibilities in an industry that is transforming the way people work and live.

Russell Brown, conference chairman for NCC '84, said Akers was asked to deliver the keynote address "because at his operational level, he can speak meaningfully on both philosophy and technology." IBM's president was selected because, according to Brown, "he will have good input on what the future holds. Whether you love [IBM] or hate them, you have got to watch them."

Worldwide responsibilities

As president of IBM and member of its board of directors, Akers serves on a tripartite policy committee along with Chairman and Chief Executive Officer John R. Opel and Vice-Chairman Paul J. Rizzo. In a recent interview with *Computerworld*, Akers said he has "worldwide functional responsibilities," with the world trade divisions and U.S. operations reporting to him. Rizzo, according to Akers, has worldwide development and manufacturing responsibilities.

In Akers' words, he "grew up in marketing," spending 15 years in marketing assignments after first joining IBM in 1960 as a sales trainee.

Prior to that, he served four years as a U.S. Navy carrier pilot after obtaining a degree from Yale University.

In January 1973, he was appointed vice-president of IBM's data processing division and became president of that division in April 1974.

He was appointed IBM vice-president in July 1976 and a month later was named assistant group executive of plans and controls for the data processing product group. It was at that point, Akers said, that his functions expanded beyond marketing to include finance and planning and resource management. In April 1978, he was appointed group executive of the data processing marketing group.

Product management experience

His experience in product management began in October 1981, when he was named group executive of IBM's Information Systems and Communications Group.

In May 1982, he was appointed senior vice-president.

It has been a heady rise to the top levels of the largest company in the computer industry: "When I've gotten to the point where I think I know what I'm doing, I usually am asked if I'd like another job, and the thing starts all over again," Akers commented.

Communications exhibits to focus on existing wares

Advanced Computer to feature DEC-compatible products; Wang to showcase net

By John Dix
CW Staff

Vendors of communications hardware will, for the most part, use the National Computer Conference here next week to showcase existing products.

Advanced Computer Communications (ACC) will be demonstrating — in the multivendor communications vein — its line of products designed to expand the communications capabilities for Digital Equipment Corp.'s computers and systems built on Motorola, Inc.'s 68000 microprocessor Versabus.

One of the controllers ACC will have on display is its Uni/Vers — a board set that enables DEC PDP and VAX systems based on the vendor's Unibus to connect and interact with Versabus-based systems.

Another Versabus product on display will be the Versabus/Ethernet Interface Unit (V/EIU), which enables Versabus systems to connect directly to an Ethernet-like (IEEE 8-2.3) local network.

ACC interfaces

ACC will also be demonstrating the IF-11/X.25 and IF-11/High-Level Data Link Control (HDLC) communications interfaces. The IF-11/X.25 Plus provides DEC systems with terminal support over X.25-based packet-switching nets, and the IF-11/HDLC is said to enable DEC systems to communicate with other systems that support the HDLC protocol.

Providing for even greater systems interconnection, at least two vendors of local-area networks will be showing their wares.

Wang Laboratories, Inc. will demonstrate its recently announced Fastlan, a scaled-down version of its broadband Wangnet. This user installable network does not, reportedly, require the final tuning procedures typically required with broadband networks.

Sytek, Inc. will also demonstrate network components, its Localnet 20/100 in particular. This product is a two-port packet communications unit that can receive and transmit data from users' devices at a rate of 19.2K bit/sec.

Along the more traditional lines of data communications products that will be displayed at NCC '84 are terminal controllers, modems and multiplexers.

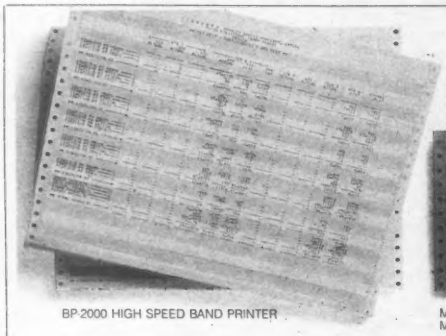
Innovative Electronics, Inc. will let showgoers test drive its terminal MC-80/600-1 — a controller that emulates IBM's 3274 and provides conversion to enable use of asynchronous Ascii terminals in an IBM synchronous environment.

Multi-Tech Systems, Inc. will showcase its line of recently announced intelligent modems, including three desktop models and two internal modem cards.

The Multi-Modem line operates at 300- to 1,200 bit/sec and is said to combine the features of the Hayes Microcomputer Products, Inc. Smartmod with features such as internal telephone number storage and dial or busy-tone detection.

Anderson Jacobson, Inc. (AJ) will have on display its AJ Expressway statistical multiplexer, its Blast asynchronous file transfer software, its AJ 1212-AD2 autodial modem and its AJ Connection multispeed modem.

Micom Systems, Inc. will show its full line of data communications products at the show, including Instanet, a local-area network-like product based on the vendor's Data private branch exchange. The network is said to use existing in-house wiring, thus eliminating the need to install cable or change architectures.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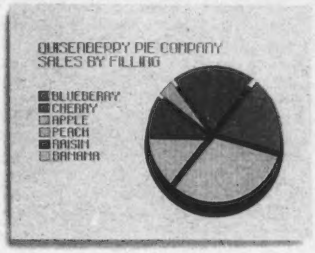

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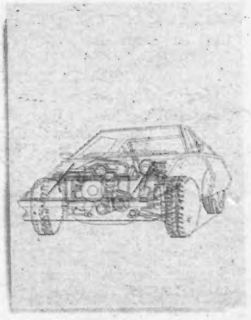
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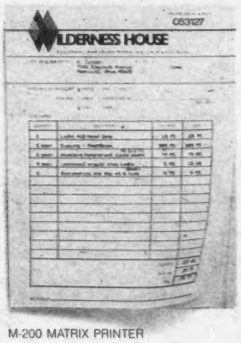

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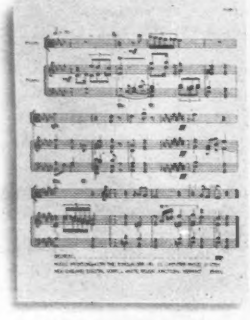
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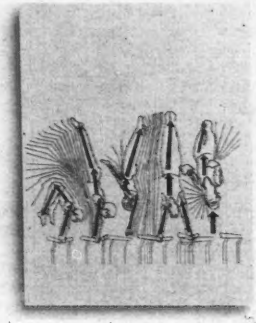
P-132 MATRIX PRINTER


MODEL 480 MATRIX PRINTER

HEAT from Preview/2

any sooner than five days in advance, noting that the weather service's 30-day forecast, issued June 14, says it will be "warmer than normal" for that time of year.

What does one do in Las Vegas to beat the heat? Don't ask Barbara DeGroot, feature editor of the appropriately named local daily newspaper, the *Las Vegas Sun*. DeGroot, who moved to Las Vegas from Minnesota two years ago, could not recall the paper having done any "hot weather stories" while she has been there. She said it's just not news.

And are there any colorful local expressions about the weather? Well, how about, "It's going to be so hot the slot machines are going to melt?" she joked.

Should one venture forth, rushing from awning to awning to avoid the searing brightness, there is, she said, a popular watering hole near the Strip. It's called the Brewery, and one of its bartenders, Chuck Pugh, believes he has just the thing to treat a sun-induced thirst: a white wine spritzer.

"Take a tall chimney glass, fill it with white wine, soda, ice and a twist of lemon," he said.

Pugh said he'd be more than happy to make one for anyone, provided they can stand the walk over in the heat.

Dataproducts printers.
Nobody puts ideas on paper so many ways.

Many mainframe software vendors sitting out NCC

By Paul Gillin
CW Staff

Elsewhere in this issue you can find out about all the new products you can see at the National Computer Conference this year. But there are a number of new products you won't see. Many of them are from the dozens of large system software vendors that have decided not to come to NCC this year.

For example, you will not see Informatics General Corp.'s Answer/DB or Dbase/Answer product. Nor will you see Information Builders, Inc.'s new PC/Focus. Don't look for Pansophic Systems, Inc.'s Easytrieve Plus; Comshare, Inc.'s System/W; Mathematica Products Group, Inc.'s Ramlink or Computer Associates International, Inc.'s CA-Executive. They're not there.

Neither is Computer Corp. of America's Prod/Net. Or Hogan Systems, Inc.'s new loan processing package. Want a demonstration of Software AG of North America, Inc.'s Natural/Vsam or Predict? You won't find it in Las Vegas. And you'll have to go to New Jersey for a look at On-Line Software International, Inc.'s Executrieve. It's not here.

That NCC is primarily a hardware show has never before been so evident from the lack of exhibitors from the independent mainframe software community. In addition to those listed above, other notable nonattendees include Boole & Babbage, Inc.; Comserv Corp.; Oxford Software Corp.; Uccel Corp.; Martin Marietta Data Systems, Inc.; Walker Interactive Products, Inc.; and Software International Corp., to name a few.

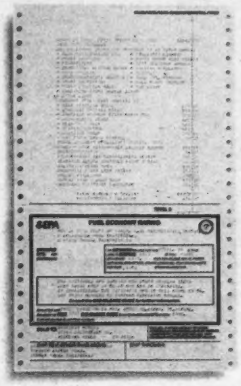
Ironically, last year marked the first NCC at which a software company executive delivered the keynote speech. John Imlay, chairman and chief executive officer of Management Science America, Inc. (MSA), told *Computerworld* that his selection as keynoter was "an important part of [the] evolution" of software into a mature industry [CW, May 2, 1983].

But software vendors are increasingly choosing forums other than NCC to display that maturity. "In terms of a marketplace for us, NCC just doesn't measure up as well as other avenues," said Tom Blondi, vice-president of marketing at Software AG. Blondi ticked off a list of reasons his company has decided this year to miss the show for the first time in five years. "NCC is way too big; it's still pretty much a hardware show; it crosses too many boundaries with regard to audience; and it's one of the most expensive shows to go to," he said.

Meldon Gafner, vice-president of sales and marketing at Issco Graphics, Inc., estimated that it costs $200,000 to support a 40- by 40-ft booth. Because Issco believes the money could be better spent in other arenas, the company is passing up NCC for the first time in 10 years. "In the past few years, NCC has not had a central theme," he said. "Your messages seem to get lost because it's so big and so diverse." Gafner noted that Issco will be orienting its future trade show presence to those addressing a specific audience. "You cannot do an educative selling process in a carnival-like atmosphere," he said.

That sentiment was echoed by a spokesman for Comshare, which last exhibited at NCC in 1982. "We don't

See **VENDORS** Preview/6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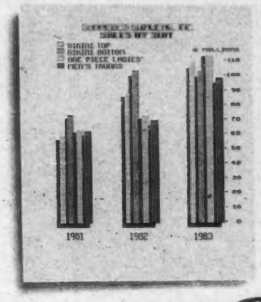
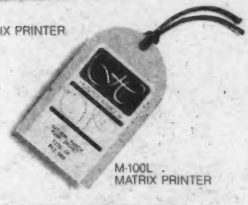

P-132
MATRIX PRINTER

B-600 MEDIUM SPEED BAND PRINTER


M-100L
MATRIX PRINTER

M-120 MATRIX PRINTER

MXT-1200 MILITARY PRINTER

B-300 MEDIUM SPEED PRINTER

DP-55 DAISYWHEEL PRINTER

P-80 MATRIX PRINTER

DP-55 DAISYWHEEL PRINTER

...and so on.

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Software to be introduced

Despite the holdouts, there will be some new software products to see on the floor of the National Computer Conference.

At Booth C4336, Battelle Memorial Institute will introduce a relational data base management system for Digital Equipment Corp.'s VAX-11 minicomputers. DM reportedly can handle long textual elements and numeric data and support hierarchical, network and multikey access models of data base organization. Each DM kernel reportedly can handle up to 511 simultaneously executing programs operating upon as many as 250 data bases, according to Battelle.

At Booth B3832, Cullinet Software, Inc. will demonstrate its IDMS/Relational (IDMS/R) system, its Goldengate integrated microcomputer software and its Information Database. IDMS/R is said to combine network and relational data base architectures and features a number of end-user-oriented application development tools.

The Goldengate series is a set of integrated tools for the IBM Personal Computer that includes an electronic spreadsheet, local relational DBMS capabilities, graphics, word processing and a directory manager.

The Information Database (IDB) is integrated with the Goldengate series and can draw summarized information from IDMS/R and other data bases and file structures for downloading.

See **EXHIBITS** Preview/6

Afips to present awards at keynote session

Three awards will be presented by the American Federation of Information Processing Societies (Afips) at the National Computer Conference's keynote session next Monday.

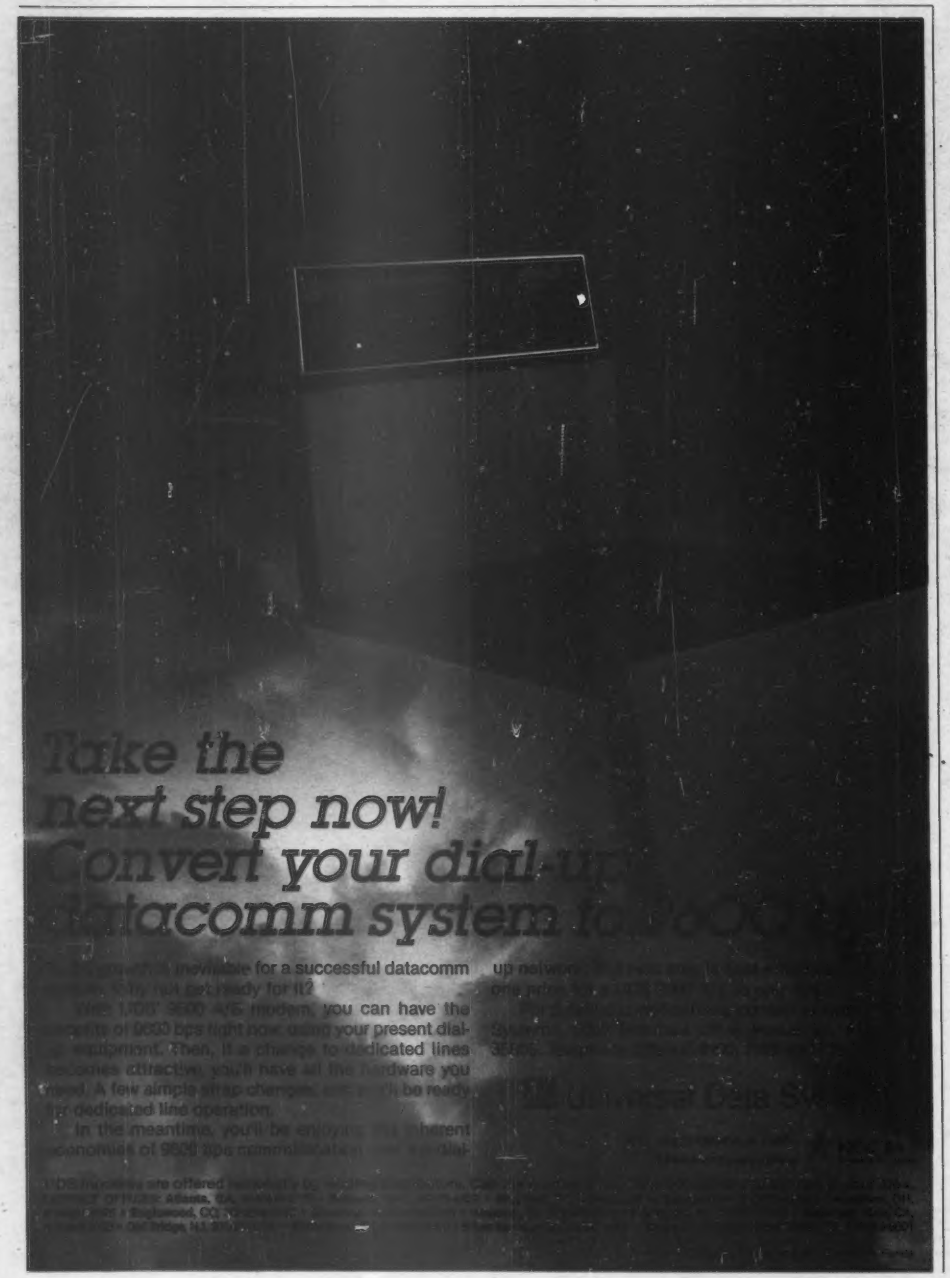
The Harry Goode Memorial Award, which in the past has been awarded to such notables as Kenneth E. Iverson, Herman H. Goldstine, J. Presper Eckert and Grace Murray Hopper, was established by Afips in 1964 to honor the former chairman of the National Joint Computer Committee, said to be the moving force behind the cooperative endeavors of the federated professional societies. The award is bestowed annually to encourage further development of the field and to acknowledge and honor outstanding contributions to the information processing sciences.

The second honor to be presented, the Distinguished Service Award, was established in 1970 to recognize outstanding individuals for extraordinary service to the information processing field through accomplishments on behalf of Afips and its 11 constituent societies.

The 1979 winner of the Distinguished Service Award was Keith Uncapher of the University of Southern California's Information Scientists Institute, who served as Afips president from 1971-72. The 1983 recipient was Dr. Richard Tanaka, a member of the Afips International Relations Committee and U.S. representative to the International Federation for Information Processing for 10 years.

Finally, the Afips Education Award will be presented. Established in 1983, it honors outstanding educational contributions in the information processing field. The award also recognizes the timely publication of scholarly books or papers, service and/or leadership in the body of educational knowledge or development of innovative teaching methods.

The 1983 Education Award was received by Dr. John Kemeny, a professor of math at Dartmouth College. Dr. Kemeny was codeveloper of the Basic programming language and of the Dartmouth Time-Sharing System.



VENDORS from Preview/5

feel we get the kind of value we need at that show and other shows," the spokesman said. "The audience is too diffuse, the cost is too high and there are many, many big companies who just dominate the show."

Comshare is instead investing more in advertising and sales material and other trade shows, including vertical market expositions, he said.

Still other companies have elected to bypass the trade show route entirely. Mathematica has decided not to participate in trade shows in the foreseeable future.

Computer Associates "made the decision about three years ago not to participate in trade shows," according to Arnold Mazur, senior vice-president of marketing. "We know the name of practically every DP manager worldwide. What's the purpose [of exhibiting] other than ego satisfaction? It's not for sales leads." The fundamental problem is that software "has always had the problem of not having the draw and sizzle of the latest box for a hardware vendor," said Robert Healy, senior vice-president of marketing for Software International. "I haven't seen that many new opportunities that we wouldn't have unearthed otherwise," he said.

All this does not mean there won't be mainframe software vendors at NCC. Among the independents exhibiting are Applied Data Research, Inc.; Cincom Systems, Inc.; Cullinet Software, Inc.; McCormack & Dodge Corp.; MSA; Oracle Corp.; Relational Technology, Inc.; and SAS Institute, Inc. They are industry giants, but still a far cry from a major presence.

EXHIBITS from Preview/5

Applied Data Research, Inc. (ADR) will be at Booth C4480 exhibiting its full line of large systems software products. Among them are Ideal, a full-scale application development system the company introduced last September, and Adroit, a computer-based training system.

Cincom Systems, Inc. will be at Booth A2434 showing its new line of mainframe-based decision support systems. The Manage User Series includes Mantext text processing, Mancalc electronic spreadsheet and Mangraf business graphics. The products are all integrated via Mantis, Cincom's application development system.

The vendor also will display the recently announced Net/Master and the Series One Plus microcomputer-based decision support system.

Unix users will have some new software to peruse. At Booth C4214, Unisource Software Corp. will display its Office Menu Tool, a package that is said to permit users to operate a Unix-based system without having to know the Unix shell or commands. The Office Menu Tool may be used to create a menu system for integrating applications, Unix commands or custom shell scripts, Unisource claimed. In Booth D3116, Pyramid Technology Corp. will demonstrate third-party application software for its Unix-based 90 series superminicomputer. Applications include software development tools, office automation applications, IBM Personal Computer-Pyramid links, data base management programs and scientific and engineering applications.

Peripherals to abound

But users can expect few big system surprises

By Tom Henkel
CW Staff

The National Computer Conference has always been a venerable occasion for hardware announcements. While major system announcements at NCC have generally been on the decline, there are traditionally countless introductions of new peripherals to take up the slack.

Don't count on seeing many big systems, however. Vendors seem to be bringing smaller and smaller systems to the show. One such example is NCR Corp.'s plans to unveil an integrated office automation system based on its Tower 1632 supermicrocomputer. The system is said to use a version of the Unix operating system and feature windowing capabilities.

Some industry watchers speculate Burroughs Corp. may choose NCC to unveil the next model of its A series of mainframe processors, just as IBM picked last year's NCC to announce its System/36. But chances are there will be few, if any, big system surprises.

Instead of announcing major products at NCC, many vendors opt to announce products prior to the show and display them at NCC. For example, Data General Corp. will show its newly announced GW/10000 and GW/8000 graphics workstations at Booth A1522. A spokeswoman added that the firm will probably show its newly announced Distributed Systems line of products.

Tandem Computers, Inc. will be showing its Nonstop TXP fault-tolerant system, unveiled last October.

Canaan Computer Corp. will use NCC '84 to display its newly announced IBM-compatible Model 5400 Departmental Mainframe. The $27,000 unit offers support for IBM's VM/CMS operating system.

One large vendor planning an NCC announcement is Charles River Data Systems, Inc. The firm said it will introduce a VME-bus-based addition to its Universe line of 32-bit superminicomputers. The firm said it will also unveil a local-area networking product at Booth C4498.

Peripherals are king at NCC, and this year will undoubtedly keep up that tradition. If you are in the market for disk drives, printers or terminals, bring a wheelbarrow to carry home the new product literature.

If you're in the market for storage products, drop by the Panasonic Industrial Co.'s Booth C3588. The firm said it plans to announce a family of 3½-in. micro floppy drives.

Or you can try Alpha Data, Inc.'s Booth A1146. The firm plans to announce a family of disk drives that feature a storage capacity of 160M bytes. Lapine Technology said it will introduce two 3½-in. Winchester disk drives at Booth H352. Emulex Corp. will unveil a mass storage subsystem at Booth A2524, and the Kennedy Co. will announce an 8-in. Winchester disk drive at Booth A1344. Those are just a sampling of vendors planning to announce new products.

If it's a terminal you want, stop by Espirit Systems, Inc.'s Booth B3732. The firm plans to announce a $495 EXP 6110 CRT terminal. Telray, a division of Research, Inc., will unveil both Digital Equipment Corp.- and Honeywell, Inc.-compatible terminals at Booth A1858. Or try Falco Data Products, Inc. at Booth B4538. The firm will introduce the Fame 100, a terminal that emulates DEC VT100 and VT52 terminals. Again, this is only a partial listing.

Want a printer? Try Genicom Corp. at Booth C3308, which will announce two shuttle matrix printers, which operate at 300 and 600 line/min, respectively. And Delphax Systems will exhibit its S 6000 ion printer at Booth A2542.

Fewer micro vendors displaying wares at this year's conference

By Eric Bender
CW Staff

Many microcomputer hardware and software vendors are bypassing the National Computer Conference this year, which will make it difficult to track down some of the hottest products now selling. For example, there's no obvious place to find two leading new contenders in the integrated productivity software market, Ashton-Tate's Framework and Lotus Development Corp.'s Symphony, because both vendors have decided to skip the show.

However, several major microcomputer suppliers, including AT&T and Compaq Computer Corp., are expected to bring out new personal computer lines at NCC. And the two largest personal computer vendors, IBM and Apple Computer, Inc., each will show a wide range of products, while a host of other products introduced during the past several months by other manufacturers will also be on display.

Among companies exhibiting products unveiled this spring is Burroughs Corp., which will show its B25 desktop microcomputer system and XE520 shared-resource processor. The B25 can be upgraded by users through a series of snap-in modules and can support up to five additional workstations, according to the company.

Data General Corp. will show its Desktop Generation micros, recently upgraded to support up to 16 users. A fully configured Model 20 reportedly now handles 16 terminals and provides 77.2M bytes of storage, a 15M-byte cartridge tape, software and 2M bytes of random-access memory (RAM).

Datapoint Corp. plans to display a range of new office products, including its Vista-PC, a color personal computer based on Convergent Technologies, Inc.'s Ngen system. The Vista-PC includes an Intel Corp. 80186 processor and starting RAM of 256K bytes and runs Microsoft, Inc. MS-DOS software.

See MICROS Preview/10

Highlights of NCCs past reflect industry's dynamic evolution

By James Connolly
CW Staff

With as many as 100,000 computer professionals gathering in a single town, it has been natural for a horde of computer vendors to use the National Computer Conference to launch new product campaigns.

In the past, as NCC has traveled from New York — where the hot products were enhancements to now aging, almost obsolete IBM 360s and 370s — to Chicago, Dallas, Houston and Anaheim, Calif., vendors have used the NCC forum to announce everything from the latest in floppy disks to mainframes and systems software.

Not only the products, but also the names have changed, with some vendors long disappeared.

Often, those hoping for major announcements have been disappointed by vendors who merely opted for displaying products announced earlier in the year.

First NCC

The first NCC conference and exposition was held in 1973 at New York's Hilton and Americana hotels and marked the return of IBM as an exhibitor at a national DP trade show after a long absence.

At that show, Greyhound Computer Corp. said its enhanced 360 Model 3 outperformed an IBM 370/125. Potter Instrument Co. unveiled its System 85, based on its Diskette Data Station. Control Data Corp. offered IBM plug-compatible tape and printer systems and a processor speed-up program designed to let the IBM 370/155 match the IBM 370/158 in performance.

One *Computerworld* headline about the show said, " 'New' Products May Reflect Period of Stabilization" [CW, June 13, 1973].

Here are some highlights of other shows:

■ **1974 — Chicago's McCormick Place.** CDC announced a plotting capability for its Cybernet time-sharing service, and first-time exhibitor American Information Services introduced its enhanced version of the IBM Virtual Machine Facility.

■ **1975 — Anaheim Convention Center.** IBM introduced its Systems Network Architecture (SNA) and its System/32, while a *Computerworld* headline said, "Government Opens Antitrust Case Against IBM," [CW, May 28, 1975]. CDC announced its 38500 mass storage system for IBM 370/145s, but most announcements focused on peripherals and enhancements for minicomputers.

■ **1976 — New York Coliseum.** AT&T demonstrated its Dataphone Switched Digital Service, and Telenet Communications Corp. linked 16 firms with its packet-switched network. Data 100 Corp. and General Systems International showed key-to-diskette units, as the mainframe vendors pushed data entry devices and printers. The one new mainframe was the Univac 90/70.

■ **1977 — Dallas Convention Center.** Harris Corp. showed three additions to its Series 100 line of systems, including the 50-user System 135. Memorex Corp. and National Semiconductor Corp. introduced memory add-ons for the IBM 370. Four-Phase Systems, Inc.'s System IV/90 and Datapoint Corp.'s 6600 were offered for distributed data processing. In another announcement at the '77 show, General Automation, Inc. introduced its GA-16/550 to the small business market.

■ **1978 — Anaheim Convention Center.** The IBM plug-compatible manufacturers caught the spotlight with memory add-ons for the IBM 30 series. Electronic Memories and Magnetics Corp., National Semi and Memorex all announced replacement memories for IBM 3031-type machines. For peripherals, California Computer Products, Inc. showed its 15,000 line/min Model 1680 computer-output microfilm unit, and intelligent terminals were offered by Teletype Corp., Racal-Milgo, Inc., Incoterm Corp., Computer Devices, Inc., General Automation, Digital Equipment Corp., Texas Instruments, Inc. and Tektronix, Inc.

■ **1979 — New York Coliseum and Hilton and Sheraton Centre hotels.** Sperry-Univac introduced the 1100/60 to compete with IBM's 4300 series, but in 1979 most of the action was in the software arena. Perkin-Elmer Corp. introduced its Cobol-based Reliance transaction processing system for 32-bit minis. NCR Corp. unveiled a multiprocessor version of its virtual-oriented VRX operating system for its 8585 processors, while SAS Institute, Inc. enhanced its SAS statistical analysis system with support for structured programming.

■ **1980 — Anaheim Convention Center.** Xerox Corp. told attendees about some of the features of the as-yet-unavailable Ethernet local-area network, and Zilog, Inc. announced its Z-Net packet-switched architecture. PE enhanced its Reliance I supermini software, while Data General Corp. brought out its Eclipse MVS-8000 and DEC enhanced its VAX-11 software.

■ **1981 — Chicago's McCormick Place.** A *Computerworld* headline said, "No Big Product Splashes at Show" [CW, May 11, 1981]. Systems Engineering Laboratories, Inc. claimed its Concept 32/87 produced benchmarks three times better than the DEC VAX-11/780, while PE gave Unix to its 3230 supermini. Also, DG revised its Xodiac network architecture, to be compatible with IBM's SNA and the X.25 protocol, and Xerox unveiled its Star workstation.

■ **1982 — Houston Astroarena.** Microcomputers moved to center stage, particularly with low-end systems, while large systems software included Westinghouse Electric Corp.'s on-line utility packages for the IBM 370 and 4300 series and Boole & Babbage, Inc.'s IBM-oriented Capacity Management Facilities package.

■ 1983— **Anaheim Convention Center.** The big news was IBM's unveiling of System/36 and NCR's release of seven models for its high-end mainframe line. At the low end, portables and IBM compatibles dominated the microcomputer news.

MONDAY

	9:30 AM to 11:00 AM	1:30 PM to 2:50 PM	3:20 PM to 4:40 PM	8:30 AM to 9:5
THE AUTOMATED OFFICE Michael R. Alsup, Arthur Andersen & Company	**KEYNOTE ADDRESS** John F. Akers, President *International Business Machines Corporation* Room A (Live) Rooms B & E (close-circuit)	**STATE OF THE ART IN OFFICE AUTOMATION** Amy Wohl, *Advanced Office Concepts* A	**ANALYZING MANAGERS/ PROFESSIONALS' NEEDS FOR OFFICE AUTOMATION** Addie Mattox, *The Mattox Group* E	**MANAGEMENT WORKSTATIONS INTEGRATED INFORMATION SYSTEMS** Evelyn Wilk, Arthur Andersen Company
HARDWARE AND ARCHITECTURE Faye Briggs, *Rice University*		**DISTRIBUTED SYSTEMS** Benjamin Wah, *Purdue University* G	**MULTIPROCESSING SYSTEMS** Faye Briggs, *Rice University* G	**32-BIT MICROPROCESS ARCHITECTURE** Richard Mateosia National Semicon
SOFTWARE A. Winsor Brown, *Volition Systems*			**COBOL 8X—THE NEW STANDARD** Jerome Garfunkel, Jerome Garfunkel Associates, Inc. D	**SOFTWARE ENGINEERING MANAGEMENT** Peter Freeman, University of Cal Irvine
COMPUTER GRAPHICS, AND ENTERTAINMENT Alan Paller, *AUI Data Graphics/ISSCO*		**EVOLUTION OF COMPUTER GRAPHICS IN AN INFORMATION CENTER** Dave Ackmann, *Monsanto Company* D		
PERSONAL COMPUTERS Jean Yates, *Yates Ventures*			**PERSONAL COMPUTER INDUSTRY: THE EXPERTS FORECAST THE FUTURE** Portia Isaacson, *Future Computing Inc.* A	**MULTIUSER AN NETWORKED PERSONAL CO** Jean Yates, *Yates Ventures*
EDUCATIONAL AND SOCIETAL ISSUES Alfred Riccomi, *Texas Instruments*		**MEDIA MICRO MANIA** Erik Sandberg-Diment, *The New York Times* E		**SMART CARDS- ULTIMATE CO COMPUTER** Henry Dreifus, Corpru Research
INFORMATION PROCESSING MANAGEMENT Eugene B. Smith, *Texas A & M University Systems*		**SOFTWARE MAINTENANCE: NEW SYNERGY** Ned McDaniel, *InfoSci, Inc.* B	**SOFTWARE MAINTENANCE: THE FUTURE OF PRESENT SYSTEMS** Nicholas Zvegintzov, *Independent Consultant* B	**BUSINESS PLA AND INFORMA SYSTEMS** Mel Mandell, *Computer Decis Magazine*
DATA BASE MANAGEMENT Darrell L. Ward, *HyperGraphics Corporation*		**CURRENT STATUS OF THE RELATIONAL DATA BASE MODEL** Mike Blasgen, *IBM Research* N	**SQL DATA BASE LANGUAGE** Arnold Romberg, *Romberg and Romberg* N	
ARTIFICIAL INTELLIGENCE James R. Miller, *Computer • Thought Corporation*		**KNOWLEDGE BASED TRAINING SYSTEMS** Elliot Soloway, *Yale University* L	**AL TECHNIQUES FOR SIGNAL INTEPRETATION** Byron Davies, *Texas Instruments* L	
COMPUTER COMMUNICATIONS Neal Laurance, *Ford Motor Company*				**MULTIVENDOR NETWORKS—P** Robert Blanc, *National Bureau Standards*
PROFESSIONAL DEVELOPMENT SEMINARS HELD AT CAESARS PALACE				**PROFESSION**
MOTIVATING AND MANAGING COMPUTER PERSONNEL, by J. Daniel Cougar, University of Colorado, Colorado Springs 1:00 pm to 4:00 pm Majestium				BREAKTHRO Management C
LETTING GO OF STRESS: by Jackie Schwartz, Schwartz & Associates 1:00 pm to 4:30 pm Regalium				THE COMPUT Law School, a
PEOPLE AND TECHNOLOGY: ISSUES AND RESPONSES: by Emmett J. McTeague, Aetna Life & Casualty 1:00 pm to 4:30 pm Julius				EVALUATING Jackson, Jet Pr
				ARTIFICIAL I
				HOW TO SAV Company 9:00

SCHEDULE at a GLANCE

TUESDAY

M to 9:50 AM	10:20 AM to 11:40 AM	1:30 PM to 2:50 PM	3:20 PM to 4:40 PM
MENT ATIONS AND TED ATION lk, dersen & B	**DESIGN AND FUNCTIONALITY IN OFFICE SYSTEMS** Patricia B. Seybold, *The Seybold Report* A	**INTEGRATION ALTERNATIVES AND STRATEGIES** Janet Millenson, *Sperry Corporation* B	**VOICE TECHNOLOGY IN THE OFFICE** Howard Morgan, *Advanced Office Concepts* B
OCESSOR CTURES lateosian, Semiconductor G	**ATTACHED FLOATING-POINT AND ARITHMETIC PROCESSORS** J. R. Jump, *Rice University* G	**NEW MULTI-ICROPROCESSOR ARCHIT©CTURES** Omri Serlin, *ITOM International Company* G	**VLSI SYSTEMS** Dharma P. Agrawal, *North Carolina State University* G
RE RING MENT man, y of California at N	**MODULA-2 AND ITS APPLICATIONS** Joel McCormack, *Volition Systems* N	**APPLICATIONS PROTOTYPING PRACTICES** Gordon C. Howell, *Georgia State University* N	**EMERGING TRENDS IN INTEGRATED SOFTWARE** Andrew Whinston, *Purdue University* E
	BUSINESS GRAPHICS: THE EXPERTS PREDICT THE FUTURE Alan Paller, *AUI Data Graphics/ISSCO* B		
SER AND KED AL COMPUTERS s, atures A		**NEXT GENERATION PCs** Mike Murray, *Apple Computer* A	**FRONTIERS IN PERSONAL COMPUTING: THE USER INTERFACE** Robert J. Lydon, *Personal Computing & Personal Software Magazines* N
CARDS—THE TE CONSUMER ER eifus, esearch, Inc L	**WORKING REMOTELY: WHERE WILL THE OFFICE OF THE FUTURE BE?** Glenn Rifkin, *CW Communications Computerworld OA* L	**ENHANCING CREATIVITY IN EDUCATION** LaRuth Morrow, *Stellar Solutions* L	**TELE-SOFTWARE DELIVERY** Marvin Talbott, *Texas Instruments* L
S PLANNING ORMATION S dell, r Decisions D	**INFORMATION MANAGEMENT IN THE '80s: A MANAGERIAL PERSPECTIVE** Allen N. Smith, *Atlantic Richfield Co.* D	**SOFTWARE DEVELOPMENT PRODUCTIVITY STRATEGIES** Denis Connor, *Ontario Worker's Compensation* D	**DISTRIBUTING INFORMATION—A MANAGEMENT PERSPECTIVE** Lynne C. Shaw, *Warner Communications Inc.* D
ENDOR RKS—PART I lanc, Bureau of ls E	**MULTIVENDOR NETWORKS—PART II** Michael Kaminski, *General Motors Corporation* E	**VIDEOTEX** Gary Arlen, *Arlen Communications, Inc.* E	**UPDATE ON LOCAL AREA NETWORKS** William Zachmann, *International Data Corporation* A

SSIONAL DEVELOPMENT SEMINARS HELD AT CAESARS PALACE

THROUGHS IN STRATEGIC PLANNING AND EDP MANAGEMENT; by Alan Paul Martin, Proactive ment Group Inc. 9:00 am to 4:30 pm Majestium

MPUTER PROFESSIONAL AS EXPERT WITNESS; by John M. Conley, University of North Carolina hool, and James J. Marcellino, Gaston Snow & Ely Barlett 9:30 am to 4:30 pm Regalium

ATING AND USING DATA BASE MANAGEMENT SYSTEMS FOR MICROCOMPUTERS; by Alyce , Jet Propulsion Laboratory 9:00 am to 4:30 pm Julius

CIAL INTELLIGENCE; by Michael Arbib, University of Massachusetts 9:00 am to 4:30 pm Augustus

O SAVE TIME & MONEY BUYING A DESKTOP COMPUTER; by Philip A. Ponder, The Ponder y 9:00 am to 4:30 pm Tiberius

WEDNESDAY

	8:30 AM to 9:50 AM	10:20 AM to 11:40 AM	1:30 PM to 2:50 PM
THE AUTOMATED OFFICE Michael R. Alsup, *Arthur Andersen & Company*	**STRATEGIC SYSTEMS PLANNING: ART, SCIENCE, OR NONSENSE?** Michael Hammer, *Hammer & Co., Inc.* B	**SHARED NETWORK RESOURCES** Dale Kutnick, *The Yankee Group* B	**MICRO-MAINFRAME CONNECTION** David Brodwin, *Arthur D. Little, Inc.*
HARDWARE AND ARCHITECTURE Faye Briggs, *Rice University*	**TRENDS IN SUPERCOMPUTER SYSTEMS: DESIGN AND USE** John Riganati, *National Bureau of Standards* E	**THE FIFTH GENERATION REVISITED** Franklin F. Kuo, *SRI International* E	**—PIONEER DAY SESSION—LAWRENCE LIVERMORE LABORATORY—THE EARLY YEARS** Sidney Fernbach, *Consultant*
SOFTWARE A. Winsor Brown, *Volition Systems*	**SOFTWARE ENGINEERING WORKSTATIONS** Maria Penedo, *TRW-DSG* N	**UNIX STATE OF THE ART** Mark Ursino, *Technology Services Corporation* A	**SOFTWARE AUTOMATION—AN INTERNATIONAL PERSPECTIVE** Raymond Yeh, *University of Marylan*
COMPUTER GRAPHICS AND ENTERTAINMENT Alan Paller, *AUI Data Graphics/ISSCO*			**NEW TECHNIQUES I AND ANIMATION** Turner Whitted, *Numerical Design Limited-University of North Carolina*
PERSONAL COMPUTERS Jean Yates, *Yates Ventures*			**DATA MANAGEMEN INTEGRATED OPERATOR ENVIRONMENTS** Michael Azzara, *Computer Systems Nev*
EDUCATIONAL AND SOCIETAL ISSUES Alfred Riccomi, *Texas Instruments*	**TELE/CONFERENCING: THE FUTURE OF BUSINESS MEETINGS** Thomas B. Cross, *Cross Information Company* A		**LEGAL ROADBLOCK TO EXPLOITATION TECHNOLOGY** Richard Stern, *Law Office of Richard Stern*
INFORMATION PROCESSING MANAGEMENT Eugene B. Smith, *Texas A&M University Systems*	**MULTIUSER MICROS VS. NETWORKED PCs** George F. Colony, *Forrester Research Inc.* D	**STRUCTURED METHODOLOGIES AND AUTOMATING THE SYSTEMS DEVELOPMENT PROCESS** Ken Orr, *Ken Orr and Associates* D	**NEW INFORMATION MANAGEMENT METHODOLOGIES** Jody Martin, *Pacific Institute*
DATA BASE MANAGEMENT Darrell L. Ward, *HyperGraphics Corporation*		**DATA BASE WORKSTATIONS** Bob Brazile, *North Texas State University* N	**ENTITY-RELATIONS APPROACH TO DAT BASE DESIGN** Peter Chen, *Louisiana State Univ*
ARTIFICIAL INTELLIGENCE James R. Miller, *Computer • Thought Corporation*	**EXPERT SYSTEMS IN THE COMPUTING INDUSTRY** Peter Friedland, *Stanford University* G	**TOOLS FOR COMMERCIAL AI SYSTEMS** Thomas P. Kehler, *IntelliCorp* G	
COMPUTER COMMUNICATIONS Neal Laurance, *Ford Motor Company*	**COMPUTER INTEGRATED AUTOMATION** Michael Flitterman, *Digital Equipment Corporation* L	**COMPUTER SYSTEMS AND DEVICES** Shaun Devlin, *Ford Motor Company* L	

PROFESSIONAL DEVELOPMENT SEMINARS HELD AT CAESARS PALACE

SOFTWARE ENGINEERING WITH ADA: by Grady Booch, Rational, 9:00 am to 4:30 pm Majestium

INTRODUCTION TO COMPUTER GRAPHICS: by Joel N. Orr, The CAD/CAM Institute, 9:00 am to 4:30 pm Regalium

TRAINING TO SUPPORT ELECTRONIC TECHNOLOGIES: MANAGING THE CHANGE: by Gloria J. Gery, G Associates, 9:00 am to 4:30 pm Julius

DATA ANALYSIS TECHNIQUES: by Richard Perkinson, QED Information Sciences, Inc., 9:00 am to 4:30 p Augustus

PROJECT PLANNING AND CONTROL WORKSHOP: by Lois Zells, Yourdon, Inc., 9:00 am to 4:30 pm Tiber

THURSDAY

2:50 PM	3:20 PM to 4:40 PM	8:30 AM to 9:50 AM	10:20 AM to 11:40 AM	1:30 PM to 2:50 PM
FRAME , Inc. B	**ELECTRONIC MAIL—CURRENT DEVELOPMENTS** Walter E. Ulrich, *Walter E. Ulrich Consulting* B	**OFFICE AUTOMATION EQUIPMENT SELECTION: Q & A SESSION** Philip J. Gill, *UNIX World Magazine* B	**LARGE OFFICE AUTOMATION SYSTEMS** William S. Brown, *North American Consultancy* B	
AY WRENCE Y—THE S ch., A-1	**—PIONEER DAY SESSION—THE OCTOPUS SYSTEM** Edward Lafranchi, *Lawrence Livermore National Laboratory* A-1			**SYSTEMS RELIABILITY** Kai Hwang, *Purdue University* E
N—AN NAL : Maryland E	**A BATTLE ROYAL: STRUCTURED TOOLS & METHODS** Stacy Goff *Hudson Henry and Associates, Inc.* N	**WRITING MICROCOMPUTER SOFTWARE THAT SELLS** Deborah Hastings *dilithium Press* N	**LARGE VS. SMALL PROGRAMMING LANGUAGES: PROS & CONS** Jean Sammet, *IBM Federal Systems Division* A-2	**MILITARY VS. COMMERCIAL DOCUMENTATION** Rita Gail MacAuslan, *Sanders Associates* B
QUES IN 3D TION d, sign rsity of a A-2	**CASE STUDIES IN COMPUTER ANIMATION** Phillip S. Mittelman, *MAGI-SynthaVision* A-2	**EMERGING STANDARDS IN COMPUTER GRAPHICS** Tom Wright, *ISSCO Graphics* L	**GRAPHICS ON MICROCOMPUTERS** John Sequilla, *Eastman Kodak Company* L	
GEMENT IN) NTS a. ems News G	**PORTABLE COMPUTERS AND THEIR SOFTWARE** Paul Heckel, *QuickView Systems* E	**TOWARDS A UNIVERSAL SOFTWARE STANDARD** Heinz Lycklama, *INTERACTIVE Systems Corporation* G		
BLOCKS ATION OF Y Richard H. L	**PROGRAMMER MALPRACTICE** Steven Brower, *Wood, Lucksinger & Epstein* L			**AN OPERATIONAL APPROACH TO PENETRATING VERTICAL MARKETS** Mary Sommerset, *Symposia Marketing Corporation* G
MATION NT OGIES te D	**DECISION SUPPORT SYSTEMS AND DISTRIBUTED PROCESSING** Daniel T. Lee, *University of Hartford* D	**INFORMATION SYSTEMS AND PRODUCTIVITY** George C. Fowler, *Texas A&M University* D	**PLANNING FOR AND SUPPORTING END USER BUSINESS COMPUTING** Dick Bonzagni, *Management Decision Systems* D	**SOFTWARE TEST AND VALIDATION** Richard DeMillo, *Georgia Institute of Technology* D
ATIONSHIP TO DATA N te University N			**FOURTH GENERATION LANGUAGES (4GLs) AND PERSONAL COMPUTERS** Boulton B. Miller, *Southern Illinois University* N	**DATA BASE APPLICATIONS AND INTERFACES** Richard Morrow, *HyperGraphics Corporation* L
	SOFTWARE ENGINEERING TECHNIQUES Ron Willis, *Hughes Aircraft* G	**NATURAL LANGUAGE INTERFACES TO SOFTWARE SYSTEMS** Martha Evens, *Illinois Institute of Technology* E	**INTELLIGENT AIDS TO DOCUMENT PREPARATION** Norm Sondheimer, *Duke University* G	**THE FIFTH GENERATION: WHAT, WHY, AND SO WHAT?** Alfred Riccomi, *Texas Instruments* A-2
		AT&T DIVESTITURE: THE AFTERMATH Joe Wetherington, *Independent Consultant* A-2	**THE WORLD OF INTEGRATED NETWORKS** Einar Stefferud, *Network Management Associates, Inc.* E	

PROFESSIONAL DEVELOPMENT SEMINARS HELD AT CAESARS PALACE

	SUPERCOMPUTERS: WHY ARE THEY NEEDED AND WHERE ARE THEY USEFUL; by Vito Bongiorno, Control Data Corporation, 9:00 am to 1:30 pm Majestium
0 pm	LOCAL NETWORKS; by Harvey A. Freeman, Architecture Technology Corporation, 9:00 am to 4:30 pm Regalium
Gery, Gery	PUTTING UNIX TO WORK ON A MICRO; by Jim Joyce, International Technical Seminars, 9:00 am to 4:30 pm Julius
4:30 pm	STRUCTURED DESIGN; by Ned Chapin, InfoSci Inc., 9:00 am to 4:30 pm Augustus
n Tiberius	AN INFORMATION SYSTEM PHILOSOPHY FOR THE 1980s; by Michael B. Ruggera, Jr., Consultant, 9:00 am to 4:30 pm, Tiberius

Pioneer Day to focus on work done at Lawrence Livermore Lab

By Donna Raimondi
CW Staff

When Lawrence Livermore National Laboratory was founded in 1952 to perform nuclear weapons research, it had an immediate need for more powerful computers than were then available. Sidney Fernbach, who ran the lab's computer center for 20-plus years, will relate how the lab's needs spurred the computer industry to build larger and better machines when he leads the Pioneer Day session "Computing at the Lawrence Livermore National Laboratory" July 11 at 1:30 p.m.

The second session of Pioneer Day, at 3:20 p.m., will examine the Octopus network Fernbach was instrumental in developing 20 years ago. The goal of the Octopus was to give all users access to all computing resources. This session will be led by Edward LaFranchi, who is now head of the Electronic Engineering Department at the Livermore Lab and was then assigned to the Computational Department to help with the manufacture of necessary equipment.

Impressive then, with four Control Data Corp. 6600 computers, a Radiation, Inc. 30,000 line/min printer and an IBM photodigital device that stored 1T bits of data (10G words) available to more than 1,000 users, the Octopus has grown tremendously. It now ties together five Cray Research, Inc. supercomputers; three CDC 7600s; IBM high-speed printers; Information International, Inc.'s FR80, which puts output on fiche or film; and several thousand users. The system is reputed to be the largest in the world and to be worth $75 million to $100 million.

Although not the first network, the Livermore Lab project was entirely custom-built by the lab's scientists. Because the scientists were connecting incompatible machines, they had to do all interfacing and development at the lab, with no history or available technology to guide them.

In its search for computing power, Livermore Lab often spurred development of systems that had limited use to the outside world. One example is the IBM-built Stretch, considered a failure because IBM lost millions of dollars on the project. The transistorized technologies used to build it, however, were the base for the IBM 7090, which sold very well.

In addition to the classified nuclear weapons work going on at Livermore Lab, the lab used its computers to develop other applications. Dr. Cecil Leith, a mathematician, designed programs to predict weather by performing advanced calculations to represent pressure and temperature on many different levels of the atmosphere. The first session will show one of his early weather development films.

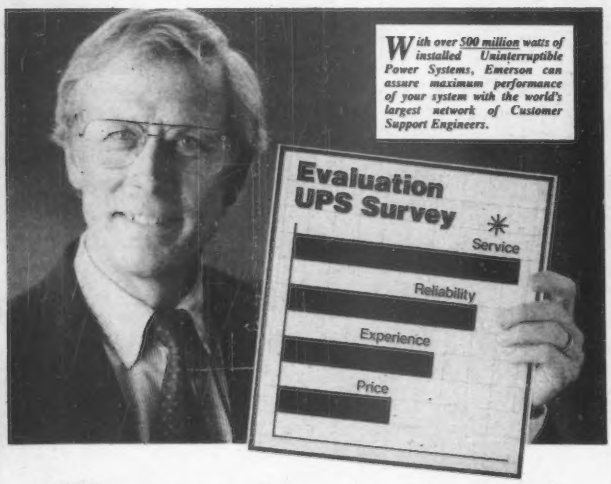
This Univac I was the first generally available commercial computer and was delivered to Livermore Lab in April 1953, just seven months after the laboratory was founded by Ernest Lawrence and Edward Teller. The computer was the same one that had appeared on national television the preceding November correctly predicting the landslide presidential victory of Dwight D. Eisenhower over Adlai Stevenson.

Other scientists studied the effects of high temperatures and high pressures on heavy material. Physicist Robert LeLevier solved equations representing the mass motion of material at high pressure, including calculations on the birth and death of stars.

The calculations of Joseph Brady, who was interested in astronomy and had plotted the orbit of planets and is now retired from Livermore Lab, came in handy in 1957 when the Soviet Union launched Sputnik I. Because of Brady's previous work on orbits, the lab had a code to program Sputnik I's re-entry into the earth's atmosphere, which it did for the Smithsonian Astrophysical Lab. Brady also computed the orbit of Halley's Comet, which will be around again in 1986, and tried to convince the National Aeronautics and Space Administration to send a probe to meet it.

Livermore Lab is now expanding its capabilities in all directions. Its massive calculations run on Cray supercomputers, and it is doing research on future, more advanced machines. Fernbach said the lab believes the concept of data flow is the wave of the future, and lab scientists are currently modifying MIT's VAL data flow language.

Sitting at the console of the Livermore Advanced Research Computer (Larc) in 1961 is Dr. Edward Teller, then associate director of the Lawrence Livermore National Laboratory. Looking on is Dr. Harold Brown, then director of the lab and subsequently Secretary of Defense during the Carter administration. The lab worked with Remington-Rand Univac to design the Larc for its special computational needs.



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MICRO from Preview/7

On the software side, Visicorp plans to demonstrate an upgraded version of its Visi On integrated package, which offers higher speeds for personal computers equipped with hard disks, and another Visi On release designed for operation on systems with floppy disk drives.

Digital Research, Inc. plans to show its Fortran-77 package, a native-code compiler compatible with a family of the vendor's languages. The firm will also exhibit its Concurrent PC-DOS operating system, its Presentation Master graphics system and its Starlink extension package for the IBM Personal Computer.

Peachtree Software, Inc. will display its Decision Manager personal productivity package, which was scheduled to begin shipment last month.

NCC also should demonstrate the ongoing shift toward building multiuser machines around newer and more powerful microprocessors such as the Intel 80286, the Motorola, Inc. 68010 and the National Semiconductor Corp. 16032 and 32032 chips. Motorola will discuss its full 32-bit 68020 microprocessor, officially introduced last month.

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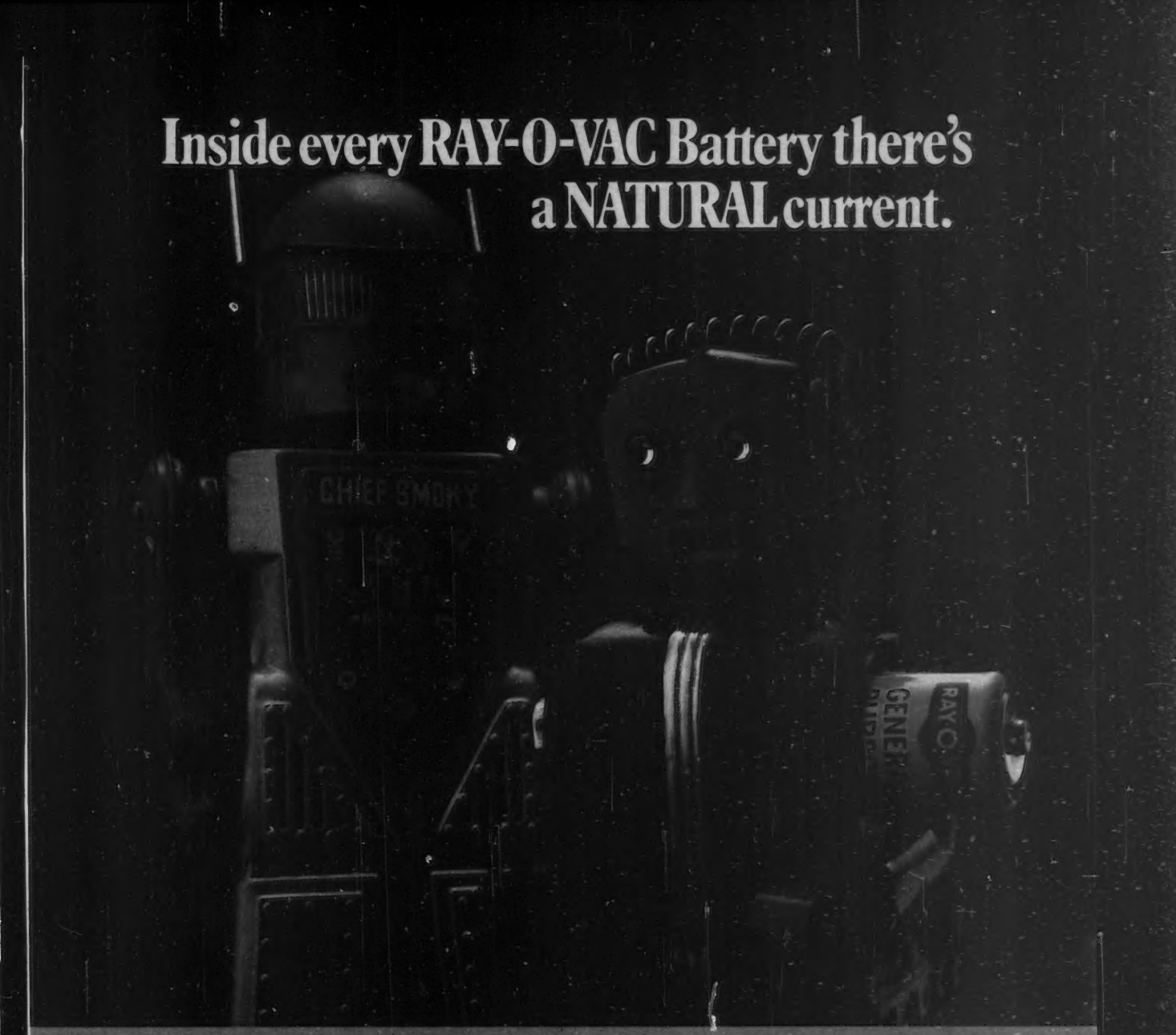

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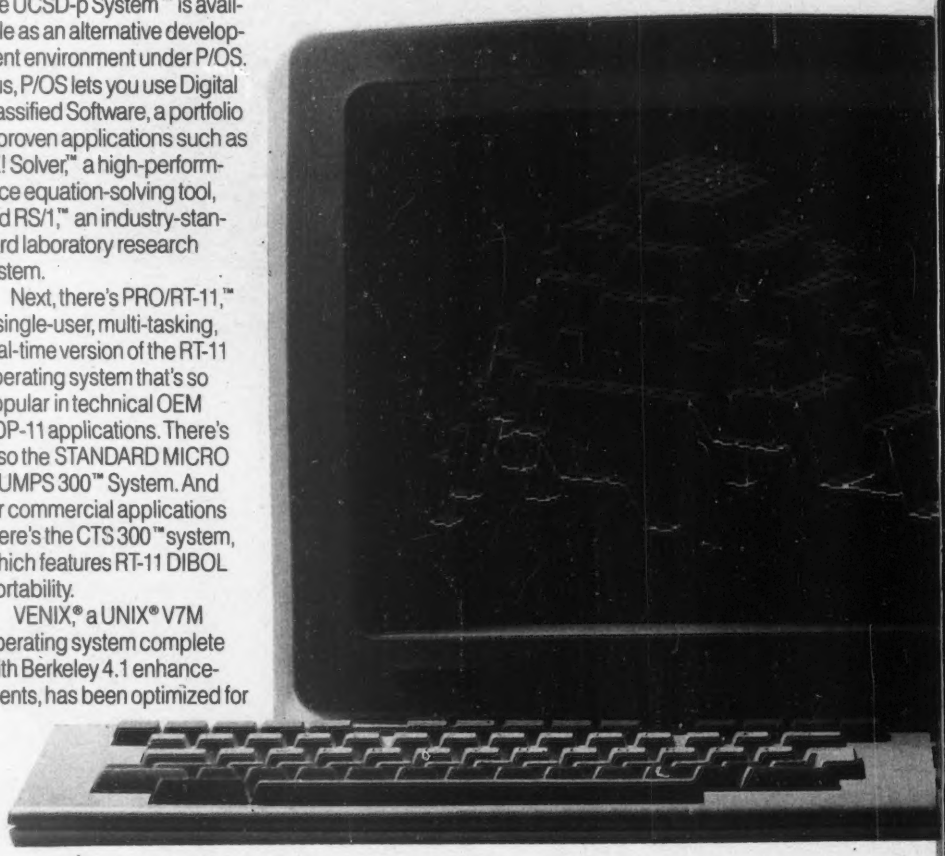

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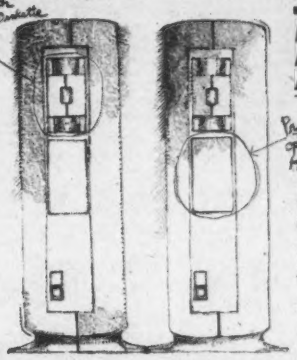

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Film forum starts Monday

The National Computer Conference film forum, which affords attendees the opportunity to relax and rest their feet, is nestled far from the NCC '84 crowds in Convention Center Meeting Rooms 2 and 3, located close to the west entrance near the rotunda.

Starting at 1:00 p.m. on Monday, July 9, and ending at 4:00 p.m. on Thursday, July 12, the forum will show approximately 75 films on subjects ranging from microcomputer technology, computer-aided design and manufacturing and aerospace to the Russian ballet.

These films, most of which run for approximately 30 minutes, are divided into two tracks: one track dealing with professional development and the other focusing on entertainment.

Noteworthy films in the schedule include the *History of NASA*, with two scheduled showings at 1:05 p.m. on Monday and 9:00 a.m. on Wednesday.

A management philosophy film, narrated by the former quarterback for the Minnesota Vikings Fran Tarkenton, is slated for Wednesday at 10:00 a.m.

A complete schedule listing of the films and their respective show times should be listed in the NCC program guide.

There is no admission charge to any film, and admission is not limited to NCC attendees.

Series of development seminars to take place at Caesars Palace

By Peter Bartolik
CW Staff

A series of 18 Professional Development seminars are scheduled during the National Computer Conference next week, ranging from buying a desktop computer to software engineering with the Ada language.

The seminar program, with half-day sessions on Monday and full-day sessions Tuesday through Thursday, will cover a wide selection of topics critical to systems development, data base technology, networking, planning and cost-effective computer usage, according to Lowry L. McKee, NCC program director.

Each seminar was designed to increase professional skills and aid in one's career development by providing attendees with information on the latest developments, applications and trends in a variety of specific areas.

All sessions will be held at Caesars Palace, with shuttle bus service available to and from the Las Vegas Convention Center. The half-day sessions on Monday, which cost $45 each, begin at 1:00 p.m. and continue to 4:30 p.m. The full-day sessions Tuesday through Thursday, which cost $75 each, begin at 9 a.m. and continue to 4:30 p.m.

The seminars on Monday, July 9, are "Motivating and Managing Computer Personnel," led by J. Daniel Cougar of the University of Colorado at Colorado Springs; "Letting Go of Stress," led by Jackie Schwartz of Schwartz & Associates; and "People and Technology: Issues and Responses," led by Emmett J. McTeague of Aetna Life & Casualty Co.

Each seminar was designed to increase professional skills and aid in one's career development.

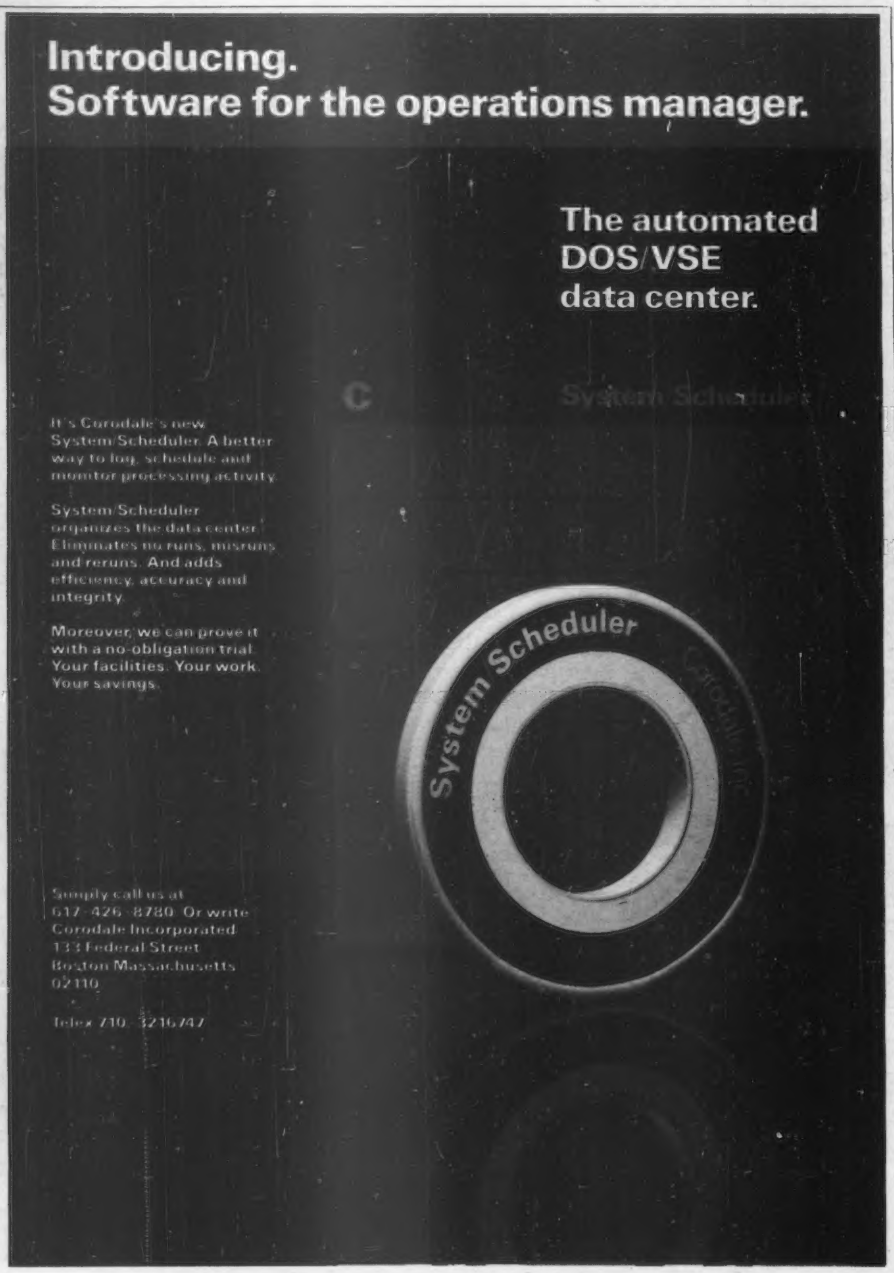
Tuesday's full-day sessions include "Breakthroughs in Strategic Planning and EDP Management," led by Alan Paul Martin of the Proactive Management Group, Inc.; "The Computer Professional as Expert Witness," led by John M. Conley of the University of North Carolina Law School and James J. Marcellino of Gaston Snow & Ely Bartlett.

Also on Tuesday will be "Evaluating and Using Data Base Management Systems for Microcomputers," led by Alyce Jackson of the Jet Propulsion Laboratory; "Artificial Intelligence," led by Michael Arbib of the University of Massachusetts; and "How to Save Time and Money Buying a Desktop Computer," led by Philip A. Ponder of the Ponder Co.

The full-day sessions on Wednesday are "Software Engineering With Ada," led by Grady Booch of Rational, Inc.; "Introduction to Computer Graphics," led by Joel N. Orr of the CAD/CAM Institute; "Training to Support Electronic Technologies: Managing the Change," led by Gloria J. Gery of Gery Associates; "Data Analysis Techniques," led by Richard Perkinson of QED Information Sciences, Inc.; and "Project Planning and Control Workshop," led by Lois Zells of Yourdon, Inc.

Thursday's full-day sessions include "Supercomputers: Why Are They Needed and Where Are They Useful?," led by Vito Bonjiorno of Control Data Corp.; "Local Networks," led by Harvey A. Freeman of Architecture Technology Corp.

Also on Thursday will be "Putting Unix to Work on a Micro," led by Jim Joyce of International Technical Seminars; "Structured Design," led by Ned Chapin of Infosci, Inc.; and "An Information System Philosophy for the 1980s," led by Michael B. Ruggera Jr., a consultant.



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Bulk of NCC '83 'tent people' plan to exhibit this year

By Jeffry Beeler
CW West Coast Bureau

Outrage over the physical conditions at last year's National Computer Conference has done little to discourage companies from exhibiting at this year's show in Las Vegas.

That conclusion emerged from a recent spot check of some of NCC '83's ill-fated "tent people," who endured sauna-like temperatures last year while occupying a makeshift exhibit hall adjacent to the conference's main show floor.

Despite lingering bitterness over last year's heat-related debacle, few of the occupants of the infamous pavilion exhibit area are willing to bypass NCC '84, the spot check revealed. The vast majority of the disgruntled tent people appear to have arrived independently at much the same conclusion: Whatever emotional satisfaction they might gain from shunning this year's conference would be more than offset by the heavy toll in lost sales leads.

So for most of the vendors, the decision to attend NCC '84 marks a triumph of financial self-interest over the competing desire to protest and redress last year's wrongs.

"NCC represents an important marketing vehicle for us," said Larry Tashbook, vice-president of marketing at U.S. Design Corp., a former tent occupant that plans to exhibit at this year's show. "So we have to weigh past dissatisfactions against current requirements."

Tashbook's sentiments are apparently shared by a large percentage of his fellow tent survivors. Of the roughly 200 companies that occupied NCC '83s temporary exhibit site, about 90% have applied for booth space in Las Vegas, according to Richard Dobson, exhibit sales manager at the American Federation of Information Processing Societies, Inc. (Afips).

Even among the vendors that do intend to stay home during NCC '84, last year's tent disaster apparently played only a minor role in the decision not to travel to Las Vegas this July. "The problems we experienced in the tents in 1983 were only one of several factors that convinced us not to participate in this year's show," according to Harvey Hartman, s senior vice-president of sales and marketingfor Molecular Computer.

"The NCC people certainly didn't help themselves by putting us where they did. But I can't say that's the only reason we're not going to NCC this year."

For Molecular, the decision to forego NCC '84 comes at a time when the conference's status as an unsurpassed promotional vehicle is being increasingly questioned. The recent explosion in the number of industry trade shows has given vendors unprecedented avenues for reaching potential buyers and has forced Molecular "to make some hard choices about which event will provide the biggest payoff," Hartman said.

After evaluating and comparing all the various trade-show options, Molecular chose to invest its scarce promotional resources in this year's Comdex/Spring and Comdex/Fall shows rather than in the July NCC, he said.

Another major factor that has discouraged some of last year's tent occupants from attending NCC '84 is the sheer size of the show. "NCC has grown to such proportions that vendors have a hard time exhibiting effectively," according to Robert Hufnagel, vice-president of marketing at Callan Data Systems, Inc.

Convinced that its product booth would simply get lost in the exhibitor crowd, Callan joined Molecular and other vendors in deciding to bypass this year's NCC, Hufnagel said.

Vendors confident

Despite scattered misgivings about the conference's value as an exhibitor showcase, few companies expect a repetition in Las Vegas of last year's tent horror story. Part of the reason for the vendor confidence is that Afips, NCC's sponsor, is apparently going to great lengths to ensure that temperatures on the conference show floor remain comfortable.

"We've hired a national consultant to analyze the air conditioning arrangements at the Las Vegas Convention Center," according to NCC '84s general chairman, Russell Brown. "Based on the consultant's recommendations, we've closed the convention center's West Hall to exhibitors because we weren't absolutely certain that the air conditioning facilities there were adequate to meet our needs."

Above all, Brown said, Afips is determined to prevent a replay of the misadventures in the NCC '83 pavilion exhibit hall, a complex of large tents adjoining the conference's focal point, the Anaheim, Calif., Convention Center. Built to hold some of the exhibitor overflow from the event's main show floor, the tents were plagued by a continuing air conditioning breakdown that sent temperatures soaring above 110 degrees Fahrenheit.

So oppressive were conditions inside the temporary quarters that equipment failed and visitor traffic dwindled to a trickle. The blistering heat left vendors hot under the collar, literally and figuratively, and for a while, inspired threats of a class-action lawsuit against Afips.

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No registration lines on Sunday, pre-NCC '84

Afips taking steps to ease registration line blues

By Paul Korzeniowski
CW Staff

The American Federation of Information Processing Societies, Inc. (Afips) hopes that a second check-in point, a sign-in hot line and extended weekend hours will pare the long lines that traditionally mark the beginning of the National Computer Conference.

An estimated three out of every four attendees did not make the June 8 early registration date this year. Most of those procrastinators will line up next Monday morning, July 9, in the Las Vegas Convention Center rotunda or at Caesars Palace for their admission passes.

"We chose Caesars Palace because approximately 10,000 attendees are staying in that area," an Afips spokesman said. "We hope that a second site will ease the registration load at the convention center."

Afips is unwilling to estimate how long showgoers will have to stand in line before receiving their admission badges.

'Beat the rush'

"A number of people could try to beat the rush and show up at one time, causing lengthy registration delays," the spokesman said. "We don't think there will be long delays on the first day, but we have no way of being sure."

Late registrants can also register by telephone, rather than wait in the early morning lines. "We placed 30,000 fliers with the registration phone number in hotel rooms so that people can call in and use a credit card to register for the show," the spokesman said.

Attendees using this registration method will have to wait two hours before picking up admission badges at a special phone-in registration desk, the Reg1100 desk located in the rotunda.

The telephone hot line will operate from 7:30 a.m. to 9:00 p.m. on Monday and Tuesday and from 7:30 a.m. to 5 p.m. on Wednesday and Thursday.

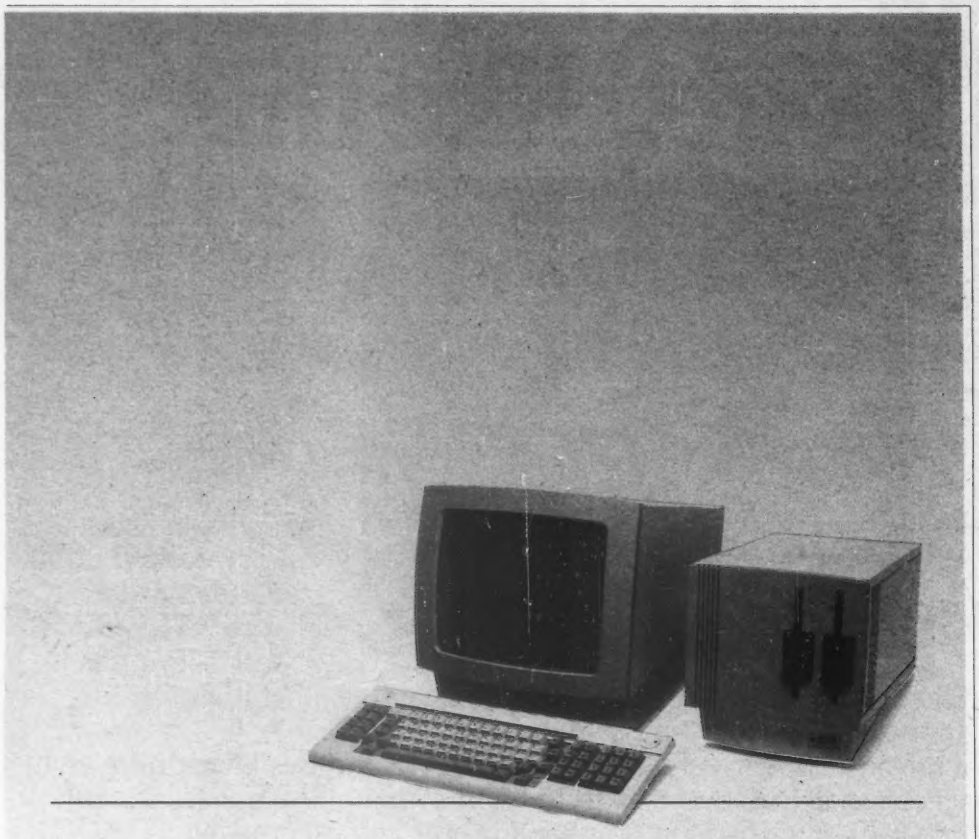
Afips has extended weekend registration times, which previously had been limited to afternoon hours, to full days, allowing early arrivals to skip the lines.

Color-coded signs

To assist attendees, color-coded signs will be placed to guide attendees to proper registration lines. Beige signs will lead those who have preregistered to their badges; blue signs will point the way to exhibitor registration; and green signs will usher in late registrants.

On-site registration will cost $125.

Rather than fight the crowds, attendees can register at the rotunda from 7:30 a.m. to 9:00 p.m. on Monday and Tuesday and from 7:30 a.m. to 5:00 p.m. on Wednesday and Thursday, the spokesman said.



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Growth of NCC puts hotel, exhibit space at a premium

By David Olmos
CW Staff

The good news is that National Computer Conference attendees can look forward to the biggest show ever. The bad news is that latecomers may find hotel rooms and exhibition space scarcer than golden nuggets.

"Frankly, I don't think people are going to be able to find a place to stay," a top show official commented.

Conference organizers had reserved a block of some 21,000 of the city's 51,000 hotel rooms, believing that number to be sufficient, according to Conference Chairman Russell K. Brown. But with conference registrations running ahead of any previous NCC, those rooms "went just lickety-split," he said.

The room shortage means that some showgoers will have to settle for lodgings outside the city. To lessen the inconvenience, NCC '84 organizers have stepped up efforts to make rental cars and buses available to help transport people to the Las Vegas Convention Center, said Brown, president of Benchmark Services, Inc., a Houston financial consulting group.

Weather will again play a role in this year's NCC. "Nobody's going to be surprised by the fact that it's going to be hot in Vegas in July," Brown noted.

In respect to the scorching desert sun, conference organizers decided to limit the exhibition sites to the convention center and the adjacent Las Vegas Hilton, rather than spread out to other hotels.

Exhibitor limit

Additionally, the number of exhibitors has been restricted to about 3,800, Brown said.

"We decided . . . we would try to hold the thing in just the Hilton and the convention center, limit ourselves to 3,800 booths and thereby allow our visitors to be able to see the entire show in contiguous quarters and not have to run all over the city in the heat," Brown explained. The exhibitor limitation has resulted in a vendor waiting list "in the hundreds."

Mid-July happens to be the hottest time of the year in Las Vegas, with the average daytime temperature reaching a pitiless 104 degrees Fahrenheit, according to Frank Taylor of the National Weather Service's Las Vegas office.

Taylor is quick to point out, however, that the humidity generally is low, so "you don't really notice the temperature that much."

Brown

Once at the conference, attendees can expect a different focus in the programs this year. Unlike past years, there will be less emphasis on academic- or research-oriented topics and more on practical subjects.

"We'll have a lot more topics that the general NCC attendee would like to know about," said NCC '84 Program Chairman Dennis J. Frailey. "We decided we wanted to provide sessions about what's happening [in the industry], what to expect in the future and how it might affect [the showgoers]."

Two new program tracks — computer graphics and artificial intelligence — have been added this year, said Frailey, a senior staff specialist with Texas Instruments, Inc. in Austin, Texas. "Both are areas that have a lot of interest now."

Brown said he expects a number of industry trends to be in evidence at the conference, including a leveling off in the microcomputer surge and increased emphasis on user friendliness.

Also, "our spies tell us that computer graphics are going to be very, very big this year," he said.

A national attendee base

In contrast to previous NCCs and because of the Las Vegas location, the estimated 100,000 attendees will be traveling longer distances to attend.

At the NCC in Anaheim, Calif., last year, a large percentage of visitors came from within a few hundred miles, Brown said.

"We have attempted to spend quite a bit of promotional money to nationalize NCC '84," he noted.

Help available for foreigners

Assistance for approximately 3,000 foreign visitors to the National Computer Conference is available at the International Visitors Lounge, located at the Las Vegas Convention Center's rotunda balcony.

Spanish, French, Japanese, German and Chinese translators can assist visitors with registration, currency exchanges, local services and hotel reservations. "The biggest problem these visitors face is telephoning home," said Stephen Gill, NCC '84 special activities chairman. The international lounge will have a message center for these attendees.

The center will be open 8 a.m. to 6 p.m., Monday through Thursday.

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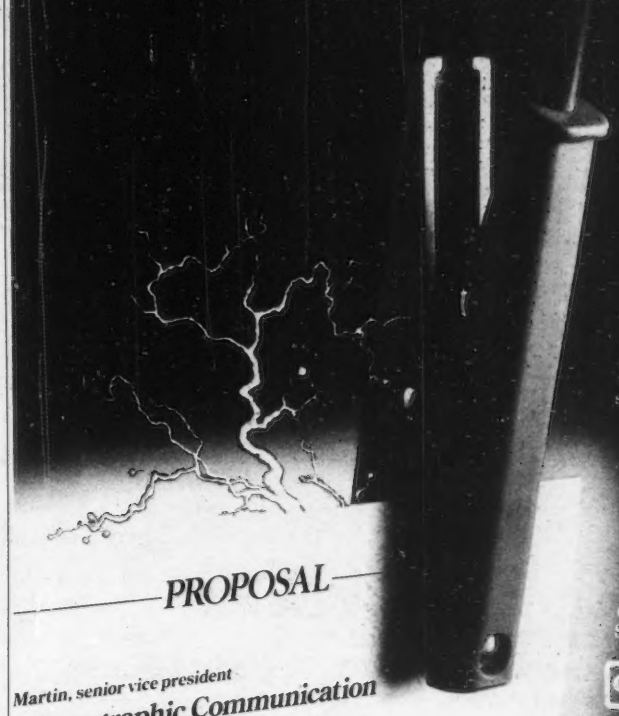

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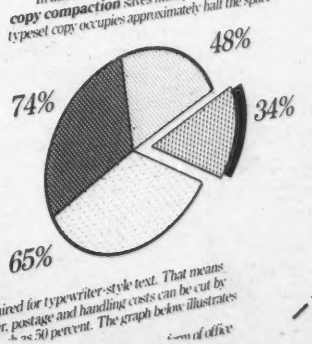

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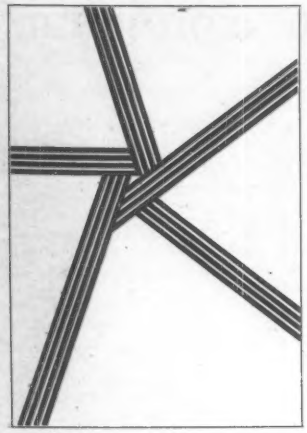


Some facts and figures on Las Vegas

Whether the National Computer Conference has drawn you to Las Vegas for the first time or you've been a frequent visitor, here are some statistics and information to give you insight on what Las Vegas is all about. (All the figures are for 1983 unless otherwise indicated.)

General information

Population: City of Las Vegas — 179,455; Clark County — 528,250; state of Nevada — 917,870.

Marriage requirements: No waiting; no blood test; available 24 hours.

Marriages: 59,835 (New Year's Eve, 1983 — 586); (Valentine's Day, 1984 — 1,054).

Divorces: 9,256.

Legal drinking age and gambling age: 21 for consumption of alcoholic beverages and 21 in all gambling areas.

Average days of sunshine: 320 (85%).

Average rainfall: 4.13 inches (arid).

Average maximum/minimum temperatures: 79.2/52.4 F, 26.2/11.3 C.

Major highways: I-15 (U.S. 91 and U.S. 466 East-West; U.S. 93 and U.S. 95 North-South).

Railroad: Amtrak (between Los Angeles, Las Vegas, Salt Lake City and Ogden, Utah) daily service.

Bus lines: Las Vegas - Tonopah, Nev. - Reno Stage Lines; Greyhound; and Trailways.

Airport: McCarren International Airport (U.S. Customs Service).

Historical information

1829 — Discovered by Spanish explorers.

1855 — First settlement by Mormons.

May 15, 1905 — Town established by auctioning of land.

April 17, 1926 — First commercial airline flight lands (Western Airlines).

1929 — Hoover Dam construction begins in Black Canyon.

1931 — Gambling legalized in Nevada (See 1981).

1936 — Hoover Dam dedicated; first power generated.

1940 — Clark County population, 16,414.

1941 — El Rancho Vegas and El Cortez hotels open.

1941 — Last Frontier Hotel opens (later New Frontier and Frontier).

1946 — Bugsy Siegel opens Flamingo Hotel.

1950 — Gaming controls strengthened (Gaming Board created).

1959 — Convention Center opens.

1960 — Clark County population, 126,016.

1967 — Howard Hughes arrives to live at Desert Inn.

1973 — Clark County population, over 300,000.

1975 — Nevada gaming revenues over $1 billion for first time.

1980 — City celebrates 75th anniversary (Diamond Jubilee).

1981 — Las Vegas celebrates "Golden Anniversary of Gaming"; population surpasses 500,000.

Tourist information

Hotel/motel rooms: 56,394.

Total visitors: 12.3 million (1983).

Convention attendance: 943,611 (16.5% increase over 1982).

Convention revenue: $652,163,666 (11% increase over 1982).

Current convention center space: One million square feet — largest single-level convention center in the country. Additional 1,065,000 square feet of convention space available in hotels.

Gaming revenue: $1,836,741,186 (4.9% increase over 1982).

Scheduled air carriers: American, Delta, Eastern, Frontier, Northwest Orient, PSA, Pan Am, Republic, TWA, United, Western, Braniff, Southwest, Ozark, American West, Northeastern International and Sunworld.

Golf courses: 11 full-length and one nine-hole course.

Tennis courts: 116 at motels and clubs; nearly 200 public courts.

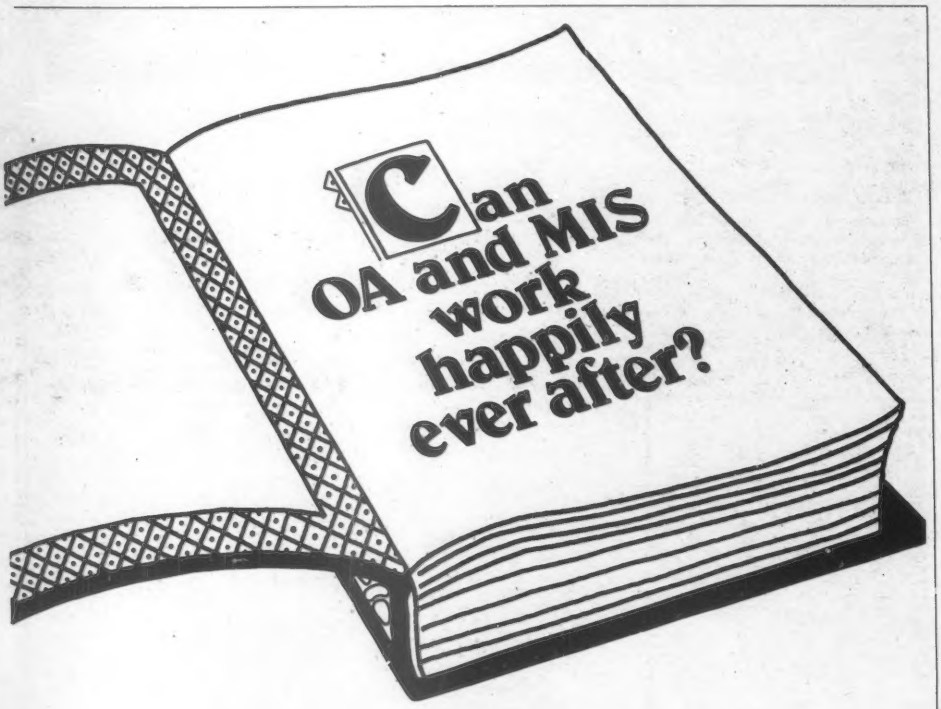
Racquetball courts: Over 70 private/public courts.

Health spas: 22.

Nearby recreation areas: Hoover Dam, Lake Mead, Red Rock Canyon, Valley of Fire and Mt. Charleston.

Regional recreation areas: Grand Canyon National Park (Arizona); Death Valley National Monument (California); Bryce Canyon National Park; Zion National Park; Cedar Breaks National Monument (all in Utah).

Types of games: Penny slots; 5 cent slots — 15,489; 10 cent slots; 25 cent slots — 16,361; $1 slots; roulette; craps; blackjack or "21"; keno; poker; baccarat; "Wheel of Fortune"; sport pools; race books; pan; bingo; Sic Bo and Pai Gow.



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SOFTWARE at NCC

CULLINET SOFTWARE, INC.
Booth B3832

Cullinet Software, Inc. will demonstrate its IDMS/Relational (IDMS/R) system, its Goldengate integrated microcomputer software and its Information Database.

According to a spokesman, IDMS/R combines network and relational data base architecture to provide a high-performance relational data base management system (DBMS). The software's Automatic System Facility allows end users to build applications through a menu-driven process, and it automatically generates the application in Cullinet's Application Development System/On-line (ADS/O) fourth-generation programming language.

IDMS/R includes Cullinet's data base tools such as Online Query, ADS/O, IDMS/DC data communications/teleprocessing monitor and the Integrated Data Dictionary. It is designed for IBM mainframes under IBM's OS/MFT, OS/MVT, OS/VS1, OS/VS2, MVS, MVS/XA, DOS/VS and DOS/VSE.

The Goldengate series is said to be a set of integrated tools for the IBM Personal Computer that can be used as a stand-alone or with the Information Database as a micro-to-mainframe link. The software includes an electronic spreadsheet, local relational DBMS capabilities, graphics, word processing and a directory manager.

The Information Database (IDB) is integrated with the Goldengate series and can draw summarized information from IDMS/R and other data bases and files structures, a spokesman said. An end user can download this information to the micro for manipulation with Goldengate. IDB is said to feature built-in data security, including identification codes that allow users to view only those files that they are qualified to access. IDB automatically handles all communications protocols between Goldengate and the mainframe software.

Cullinet, 400 Blue Hill Drive, Westwood, Mass. 02090.

CINCOM SYSTEMS, INC.
Booth A2434

Cincom Systems, Inc. will display six products in the area of data base/data communications and applications software.

The Manage User Series is a mainframe-based decision support system, including Mantext text processing, Mancalc electronic spreadsheet and Mangraf business graphics. Mantis, the vendor's application development system, integrates the Manage User Series and is a prerequisite for using Mangraf or Mancalc. Available for IBM or plug-compatibles using the OS or DOS operating systems, the program sells for between $34,300 and $53,200 for all modules. Individual prices are: Mantext, $23,100 to $42,000; Mangraf, $9,950; and Mancalc, $12,500.

The vendor also will display Net/Master, a network management system that reportedly integrates a multiapplication IBM computer network into a single operating unit. Net/Master operates on IBM 4300 and 30 series mainfames and plug-compatibles under IBM's MVS and OS/VS1 operating systems.

The price is $40,000 to $70,000, depending on machine environment and components.

Series One Plus is a microcomputer decision support system that includes word processing, spreadsheet, graphics, data management and a report writer. It operates on the IBM Personal Computer, Personal Computer XT and compatibles, as well as other microcomputers. Packaged with the vendor's new Personal Computer Contact, a mainframe-to-micro communications package, Series One Plus is priced from $10,000 to $30,000, depending on machine environment.

Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

APPLIED DATA RESEARCH, INC.
Booth C4480

Applied Data Research, Inc. (ADR) plans to exhibit its line of software products for IBM 3080 and 4300 series mainframes.

ADR/Ideal, is a fourth-generation application development system, with prices ranging from $50,000 to $82,000.

ADR/Datacom/DB is a relational data base management system at prices from $62,600 to $80,500.

ADR/Vollie ($14,700 to $19,600) and ADR/Roscoe ($52,200) are on-line program development tools.

ADR/Librarian is a source program management system costing between $18,000 and $27,200.

ADR/DL is an on-line Cobol development system, with prices between $19,300 and $23,400.

ADR/Email is an interactive electronic mail system priced from $19,400 to $39,400.

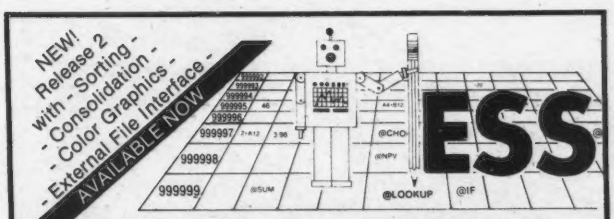
ADR/ETC is a word processing system priced between $19,100 and $26,000.

ADR/Look is a real-time performance management system ranging from $11,400 to $32,500.

ADR/PC Adroit is a $20,000 computer-based training system.

All products except ADR/Roscoe,

Continued on Preview/22



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Continued from Preview/21

ADR/Vollie and ADR/PC Adroit run under IBM's OS or DOS operating systems. ADR/Roscoe runs under OS only. ADR/Vollie works with DOS only. ADR/PC Adroit is designed for IBM's PC-DOS.

Applied Data Research, Rt. 206 & Orchard Road, Princeton, N.J. 08540.

BATTELLE MEMORIAL INSTITUTE
Booth C4336

Battelle Memorial Institute will introduce a relational data base management system for Digital Equipment Corp. VAX-11 minicomputers under DEC's VMS operating system.

DM reportedly has the ability to handle long textual elements as well as numeric data. It uses the relational method to achieve data independence and supports hierarchical, network and multikey access models of data base organization, the vendor said.

Each DM kernel reportedly can handle up to 511 simultaneously executing programs operating upon as many as 250 data bases. Each user can manipulate up to 10 data bases at once, the company said.

DM is supported by an active data dictionary and can support up to 65,000 end users. The system offers comprehensive validity checks, integrity constraints and a full complement of security mechanisms.

The price of DM starts at $29,000, depending on the modules selected.

Battelle, 505 King Ave., Columbus, Ohio 43201.

SIMWARE, INC.
Booth A2542

Simware, Inc. has introduced Sim3278 PC, a communications package that brings IBM 3270 series terminal capabilities to personal computers.

Sim3278 PC features a multiple session manager that allows users to be logged onto from one to 12 applications and enter simple commands to move from one application to another application, Simware said. The STATUS command allows the user to display active sessions and transfer to or create another session. The product reportedly features on-line, context-specific help functions.

The product requires host and personal computer software. A one-time licensing fee for IBM's MVS operating system costs $15,000; a licensing fee for IBM'S VM operating system sells for $8,000. Microcomputer software costs $195.

Simware, 969 Bronson Ave., Ottawa, Ont., Canada K1S 4G8.

PYRAMID TECHNOLOGY CORP.
Booth D3116

Pyramid Technology Corp. has announced that it will demonstrate several third-party software application packages on its 90X superminicomputer.

The packages, based on Unix System V and Unix 4.2 from the University of California at Berkeley, were developed at Pyramid's request.

Applications include software development tools, office automation applications such as word processing, IBM Personal Computer/Pyramid links, data base management programs and scientific and engineering applications.

Pyramid Technology, P.O. Box 7295, Mountain View, Calif. 94039.

UNISOURCE SOFTWARE CORP.
Booth C4214

Unisource Software Corp. will display their Office Menu Tool, a package said to permit users to operate a Unix-based system without having to be familiar with the Unix shell or commands.

The Office Menu Tool may be used to create a menu system for integrating applications, Unix commands or custom shell scripts, according to the vendor.

Menus can be constructed with multiple levels, and each menu item has a unique description and help screen, according to a company spokesman.

Office Menu Tool was designed to operate with Unix-based operating systems such as Venix/86, a licensed implementation of Unix from Venturcom, Inc. on the IBM Personal Computer.

Other operating systems that support Office Menu Tool include Venix/11 and Unity on Digital Equipment Corp. PDP-11 systems and Berkeley Unix 4.2 on the DEC VAX, the vendor said.

Office Menu Tool is priced at $125, the vendor said.

Unisource Software, 71 Bent St., Cambridge, Mass. 02141.

GENERAL ELECTRIC CO.
Booths H120-H220

General Electric Co. will demonstrate its integrated computer-assisted engineering software for plastics injection molding.

According to a spokesman, GE has integrated four packages under the name I-Deas-In-Plastics.

The packages utilize a shared data base and can help the evaluation and optimization of computer designs for styling, part mating, moldability and durability.

The software runs on Digital Equipment Corp.'s VAX-11/780 ($150,000), VAX-11/750 ($120,000) and VAX-11/730 ($90,000) systems.

The system includes Moldflow, which predicts the flow patterns of plastic resins during the injection molding process, as well as temperature, pressures, shear data and molded-in stresses; and Polycool, which predicts the efficiency of mold cooling systems and allows the design of optimal, balanced cooling systems that shorten cycle time and increase mold machine throughput, GE said.

Geomod is a solids modeler utilizing precise and faceted geometry to enable a user to develop conceptual designs of plastic parts and molds. Superfab is used for finite-element modeling, and it shortens the time needed to prepare and review data used by Moldflow and various structural analysis programs, the vendor said.

General Electric, P.O. Box 5900, 101 Merritt 7, Norwalk, Conn. 06856.

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COMMUNICATIONS at NCC

ADVANCED COMPUTER COMMUNICATIONS
Booth D3104; D3106

Advanced Computer Communications will showcase a line of products designed for Digital Equipment Corp. VAX and PDP-11 machines.

Uni/Vers is a $5,000, two-board, high-speed controller that acts as a bridge between DEC's Unibus and the Motorola, Inc. Versabus. The product is said to provide an intelligent front end for DEC's VAX and PDP-11 computers.

Another product, the IF-11/X.25 Plus communications interface, reportedly supports local and remote terminal access to DEC computers through X.25 packet-switching networks. The front end frees the host of all packet assembly/disassembly and line control functions, according to the vendor. Up to 32 terminals can be supported over a single network trunk. Pricing on this interface starts at $9,500.

The IF-11/High-Level Data Link Control point-to-point datalink, which will also be demonstrated, is said to provide high-speed data transmission and high-volume data throughput in excess of 500K bit/sec. It costs $7,500.

Finally, the vendor's Access Courier/XNS protocol package offers a protocol backbone for creating distributed processing network system in a multivendor, multioperating-system environment, the vendor said. Pricing starts at $2,500.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101.

INTERPRETER, INC.
Booth D3022

Interpreter, Inc. will introduce the Interpreter Communications Control Unit (CCU), which can interconnect dissimilar office automation units without losing any pagination or format control signals.

CCU's RS-232 interface can interconnect with most other RS-232 devices, such as Wang Laboratories, Inc. OIS; NBI, Inc.'s word processor; microcomputers from IBM, Apple Computer, Inc. and Commodore Business Machines, Inc.; Xerox Corp. 850 and 860 printers; and Xerox 5700 and IBM 6670 laser printers.

The Interpreter CCU has a 16-bit microprocessor and 128K bytes of onboard memory. It has six communications ports and handles speeds of 300 bit/sec, 1,200 bit/sec, 2,400 bit/sec or 4,800 bit/sec.

Basic price for the CCU is $17,000, including installation and documentation.

Interpreter, 11455 W. 48th Ave., Wheatridge, Colo. 80033.

INNOVATIVE ELECTRONICS, INC.
Booth A1333

Innovative Electronics, Inc. will be displaying a terminal controller/converter that reportedly enables asynchronous Ascii devices to be used in IBM environments.

The MC-80/600-1 emulates an IBM 3274 Model 51C communications controller running configuration support level A. The device supports Digital Equipment Corp. VT100-compatible terminals as full-function IBM 3277 Model 1, 3277 Model 2, 3278 Model 1 or 3278 Model 2 terminals with an IBM host using Ebcdic and Binary Synchronous Communications.

The stand-alone, self-powered processor provides up to 16K bytes of read-only memory, 16K bytes of random-access memory and two serial communications ports. It is priced at $1,295.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

WANG LABORATORIES, INC.
Booth C3918

Wang Laboratories, Inc. plans to demonstrate Fastlan, a user-installable local network for Wang and other companies' equipment.

Fastlan consists of three modules: Fastlan-A, a broadband radio frequency amplifier unit; Fastlan-B, a network branch, with two coupler boxes, which is connected to an amplifier unit; Fastlan-C, a drop cable with a four port Wangnet multiuse outlet that connects to a coupler box, Wang reported.

The three components can reportedly be combined in configurations ranging from four to 640 ports and covering a radius of up to 300 feet. Fastlan-A costs $995; Fastlan-B is priced at $350; Fastlan-C sells for $120.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

UNIVERSAL DATA, INC.
Booth D3529-3531

Universal Data, Inc. has announced its UDI-100 line of bar-code readers, hand-held terminals designed for use in retail, manufacturing, agriculture and construction applications.

The UDI-100 is reportedly capable of one-way or two-way communications with host computers. The unit is RS-232 compatible and transfers Ascii data asynchronously through an acoustic coupler or direct-connect modem at 300 and 1,200 bit/sec.

The basic model, UDI-100A, features 16K bytes of random-access storage and 16K bytes of eraseable programmable read-only memory or read-only memory and is priced at $1,075. Three other models, with features such as memory expansion capabilities and laser software, range in price up to $1,995.

Universal Data, 3960 M-15, Clarkston, Mich. 48016.

ZAISAN, INC.
Booth H546

Zaisan, Inc. will exhibit the ES.1 voice/data workstation, which is said to integrate a telephone, terminal display, full keyboard and an internal 300 bit/sec full-duplex modem.

The ES.1 is said to be capable of simultaneous voice/data communications using two telephone lines. It has a telephone directory with single keystroke dialing and autoredialing of the last 15 telephone numbers.

The 9-in., high-resolution CRT terminal displays 25 rows of 80 characters. The keyboard includes 10 function keys, and the control panel has 13 programmable function keys. Two modular telephone plugs are standard.

The Zilog, Inc. Z80 processor has 48K bytes of read-only memory (ROM) and 8K bytes of battery backup Cmos random-access memory (RAM), the vendor said. An additional 24K bytes of Cmos RAM is available, and 64K bytes of ROM is available in 32K-byte cartridge increments, the vendor said. Other options are a 1,200 bit/sec full-duplex modem and an RS-232 serial cassette interface. The device costs $995.

Zaisan, 13910 Champion Forest Drive, Houston, Texas 77069.

SYTEK, INC.
Booth C3474

Sytek, Inc. will demonstrate the recently introduced Localnet 20/100, a two-port packet communications unit that can receive and transmit data from users' devices at a rate of 19.2K bit/sec.

Localnet 20/100, which includes a coaxial cable connection, provides for remote accessed diagnostics and automatic self-test facilities, Sytek said. The product reportedly selects, under user or network management control, one of 20 logical channels within one of six network frequency groups on which to operate.

A two-port version of Localnet 20/100 costs $1,090, while an eight-port version sells for $3,750.

Sytek, 1225 Charleston Road, Mountain View, Calif. 94043.

CERMETEK MICROELECTRONICS
Booths H817, H917

Cermetek Microelectronics will have on display two AT&T 212A-compatible modems.

The Info-Mate 212A has an RS-232C serial interface and can be operated from a terminal's keyboard. Electronic tone detection reportedly allows the modem to differentiate between and respond to a busy signal, a no-dial tone, ring-back, modem answer tone and human voice.

It operates at 110, 300 and 1,200 bit/sec with synchronous or asyn-

Continued on Preview/26

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COMPUTER POWER SYSTEMS CORP.

OLWORTH'S

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The Metropolitan Insurance Companies chose the DPS 6/40 for its reliability, expansion capability, ease of use, and the quality of support available from Honeywell. They also liked its combination of price/performance, local processing power, and communications.

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We think it's a wise policy.

For more information on how Honeywell computers can help solve your problems, call 800-328-5111, Ext. 2705. (In Minnesota, call collect, 612-870-2142, Ext. 2705) or write Honeywell Inquiry Center, MS 440, 200 Smith Street, Waltham, MA 02154.

Together, we can find the answers.

Honeywell

See us at NCC Booth 3518

Continued from Preview/23

chronous transmissions and stores 52 32-digit telephone numbers or logon messages.

The Info-Mate 212PC reportedly was made for the IBM Personal Computer XT and compatibles. It is said to plug into an expansion slot in the XT. It operates at 110, 300 and 1,200 bit/sec with asynchronous transmissions and features a 60-number telephone or logon directory in its Modem-Mate software.

The Info-Mate 212A is available now and costs $595. The Info-Mate 212PC also is available now for $480, including the communications software.

Cermetek Microelectronics, 1308 Borregas Ave., Sunnyvale, Calif. 94089.

MULTI-TECH SYSTEMS, INC.
Booth D3316

Multi-Tech Systems, Inc. will demonstrate its recently announced line of intelligent modems.

The Multi-Modem line includes three desktop models and two internal modem cards. The desktop models include the 300 to 1,200 bit/sec Multi-Modem, which is said to combine the features of the Hayes Microcomputer Products, Inc. Smartmodem 1200. The Multi-Modem features additional capabilities such as internal telephone number storage and dial or busy tone detection. The Multi-Modem costs $549.

The other desktop models are the 300 to 1,200 bit/sec Multi-Modem Hayes Compatible (HC), which costs $549, and the 300 bit/sec Multi-Modem HC3, which is priced at $289. Both models are compatible with Hayes' Smartmodem.

The two-card modems for use with personal computers include the 300 to 1,200 bit/sec Multi-Modem PC for the IBM Personal Computer and the 110 to 300 bit/sec Multi-Modem IIe for the Apple Computer, Inc. Apple II, II+ and IIe.

The boards plug directly into the micro's expansion bus and come with a communications software package. The Multi-Modem PC costs $549; the Multi-Modem IIe costs $329.

Multi-Tech Systems, 82 2nd Ave. S.E., New Brighton, Minn. 55112.

ANDERSON JACOBSON, INC.
Booth A1416

Anderson Jacobson, Inc. will demonstrate its AJ Expressway statistical multiplexer, its Blast asynchronous file transfer software, its AJ 1212-AD2 autodial modem and its AJ Connection multispeed modem.

The AJ Expressway statistical multiplexer supports four terminals at data rates up to 9,600 bit/sec concurrently on a leased line or data link. It is expandable in four-channel increments to 16 ports for both synchronous and asynchronous applications. Prices range from $1,850 to $7,200.

The Blast asynchronous file transfer software is said to link more than 70 different models of microcomputers, minicomputers and mainframes using asynchronous communications and RS-232C serial interfaces. Both sending and receiving computers must use Blast. The Blast is priced at $250.

The AJ 1212-AD2 is a multispeed synchronous and asynchronous modem that can dial designated computers upon receipt of a code name rather than a telephone number. It allows passwords and logon sequences to be checked, changed and secured. It costs $695.

The AJ Connection modem expansion board operates at rates between 300 and 1,200 bit/sec with automatic adaptation to incoming data rates. The price for the AJ Connection is $495.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

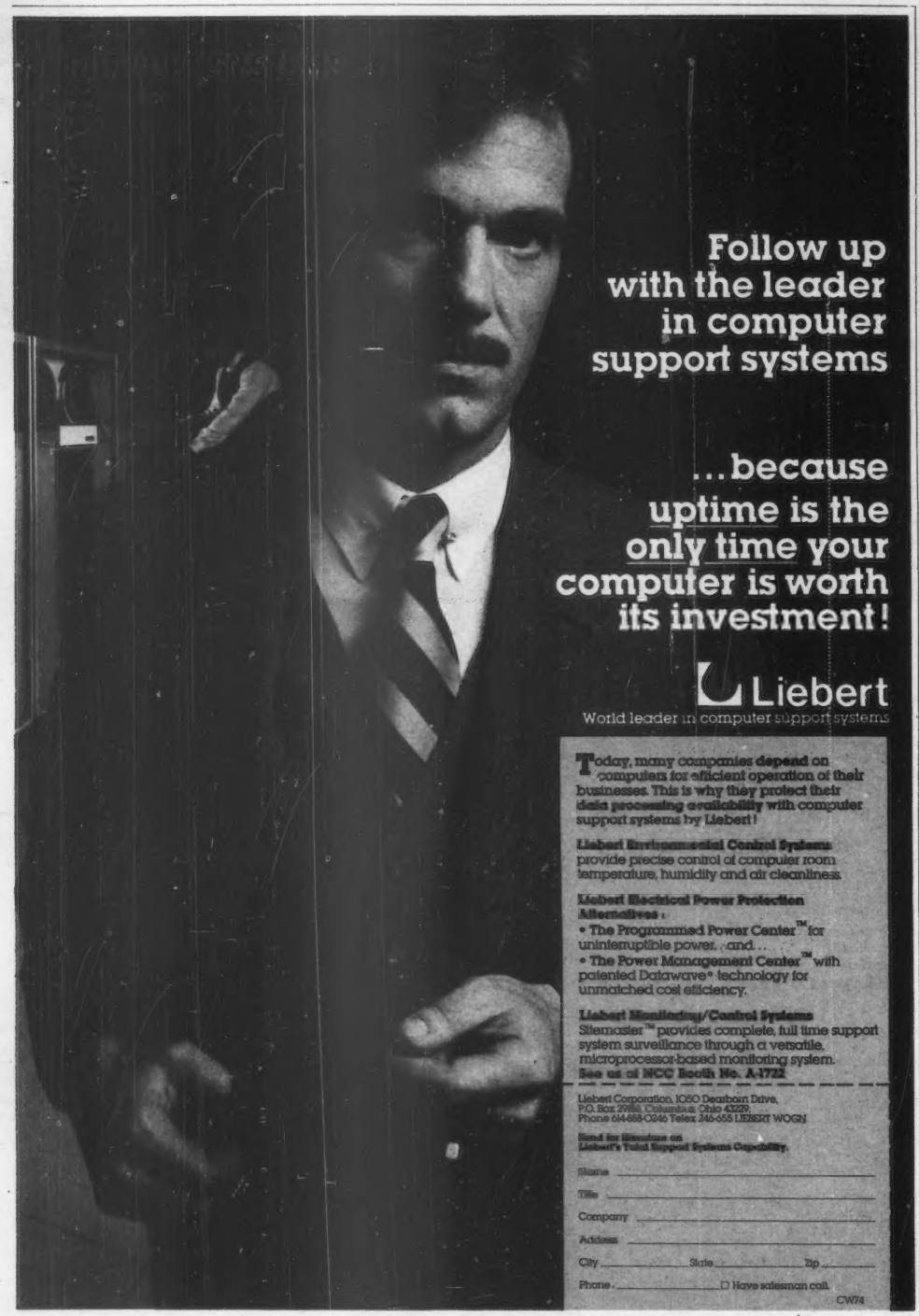
DIGITAL PATHWAYS, INC.
Booth C3130

Digital Pathways, Inc. will be exhibiting the Defender II/Model 8, an eight-line computer security dial-in access system that is said to protect computers from unauthorized dial-in access.

The Defender II/Model 8 may be used as a stand-alone unit protecting up to eight telephone lines or as a slave unit in a larger dial-in network.

The Defender II will be available in August, and it is priced at approximately $3,600, according to the vendor.

Digital Pathways, 1060 E. Meadow Circle, Palo Alto, Calif. 94303.



SYSTEMS & PERIPHERALS at NCC

CANAAN COMPUTER CORP.
Booth C4382

Canaan Computer Corp. will demonstrate its Model 5400 Departmental Mainframe. The 5400 is IBM 370-compatible and supports the 370 VM/CMS operating system in an office environment. The starting price of the 5400 is $27,400, which includes a 32-bit processor, 1M byte of main memory, an intelligent communications controller and an internal 12 bit/sec modem in a console cabinet with power supply, 16-slot backplane and peripheral attachment facility.

Also shown will be the Canaan TM5202 terminal, which supports IBM 3278-2 display emulation and connects to the 5400 Departmental Mainframe. The TM5202 has a 12-in. green phosphor tilt-and-swivel screen and 24 80-char. lines. The price of the TM5202 terminal is $1,500.

In addition to these products, Canaan will exhibit the TM5201 graphics monitor, which has a 15-in. diagonal green phosphor screen and shows 34 line/screen, 81 char./line. The TM5201 connects to the Series 5000 Departmental Mainframes, and the price of $4,600 includes a graphics controller board.

Canaan Computer, 39 Lindeman Drive, Trumbull, Conn. 06611.

Storage Technology Corp.
Booth C3718

Storage Technology Corp. will display a number of its end-user and OEM products, including the 7640 Optical Storage Unit, the 4305 Optimizer Storage Subsystem and the 8380 Disk Drive.

The 7640 Optical Storage Unit can store graphics, renderings, X-rays, electrograms, charts and diagrams that aid medical research. It contains a drive with its own dedicated control electronics and works self-sufficiently. It also houses the company's 7440 Optical Media Unit, a 14-in. precision platter said to offer 4G bytes of data storage.

The 7640 is priced at $130,000 to end users, and the 7440 cartridges range in price from $150 to $240, depending on the number purchased, the vendor said.

The 4305 Optimizer Storage Subsystem uses a 64K-byte random-access memory chip for storage. The 4305 is priced at $323,500, the vendor said.

The 8380 with dual-porting architecture is said to minimize data traffic delays. It is said to provide up to 20% faster I/O response time than the comparable IBM product. The 8380 is priced at $96,920, the vendor said.

Storage Technology, 2270 S. 88th St., Louisville, Colo. 80028.

TANDEM COMPUTERS, INC.
Booth D4022

Tandem Computers, Inc. will exhibit its Nonstop TXP system, said to address high-volume transaction processing needs. Features of this system include 32-bit native addressing, 64-bit memory and 64K bytes of cache memory per processor.

The Tandem Nonstop TXP system includes two CPUs, each with 2M bytes of main memory; two 128M-byte disk drives and controllers; a 45-in./sec tape drive; four I/O power supplies; an operations and service processor; and system software, including the firm's Guardian operating system, Encompass data base management system and Cobol. The system costs $328,550, the vendor said.

In addition, Tandem will show its 653 series terminal family. These terminals incorporate ergonomic features such as nonglare screens; low-contrast colors; and detachable, low-profile keyboards with palm rests and two-position tilt adjustment.

The 6530 terminal is the original in the family. It features a standard tilt-and-swivel screen and measures 15 in. diagonally. The price of the 6530 is $2,300.

Two more recent models are the 12-in. 6531, which costs $2,100; and the 6532, which features a 9-in. screen and costs $1,950. Both offer detachable CRT monitors, which can be placed either on top of or six feet away from their corresponding electronics boxes. The tilt-and-swivel screen is optional.

Demonstrated along with the 653 series terminal family will be a voice input option that allows terminal operators to use speech as an alternative means of entering data into Tandem Nonstop systems. Its price is $1,800.

Also exhibited will be the EM3270, which allows 653 series terminals to access concurrently bisynchronous 3270 applications running on IBM-compatible hosts (via a Tandem system) and application programs running on any model of Tandem system. The product includes host software and special terminal key caps. Pricing for EM3270 for a Nonstop 1+ system is a basic monthly maintenance fee of $50/system; for Nonstop II and TXP systems there is a one-time license fee of $500/processor plus a $20/system basic monthly maintenance fee.

In addition to these products, Tandem will show the Model 5530 letter-quality printer. It is a 55 char./sec daisywheel that features multinational character sets, programmable line spacing and automatic paper feed for unattended printing. The Model 5530 is compatible with Tandem Nonstop II and Nonstop TXP systems and is priced at $3,950.

Tandem Computers, 19333 Valico Pkwy., Cupertino, Calif. 95014.

CHARLES RIVER DATA SYSTEMS, INC.
Booth C4498

Charles River Data Systems, Inc. will introduce two VME-bus-based products, the Universe 2203 computer system, a 32-bit supermicrocomputer; and the CP 2000, a two-board central processor. Both products, priced from $15,000 to $20,000, are aimed at OEMs who require the power of a 32-bit system.

Charles River Data Systems, 983 Concord St., Framingham, Mass. 01701.

ANALOG & DIGITAL PERIPHERALS, INC.
Booth A1846

Analog & Digital Peripherals, Inc. (ADPI) has announced it will exhibit its RS-232 cassette system, its portable RS-232 Megabyte bucket cassette system and its compact RS-232 or 8-bit parallel Little Guy 2 portable minicassette system.

According to a spokesman, the RS-232 cassette system provides data transfer between older NCR Corp. Cassette Load/Store systems and NCR's 9300, Tower or PC Decisionmate systems. It features variable block length with cyclic redundancy check, double-buffered I/O, Ascii or binary character-code control and transmission rates ranging from 110 to 9,600 bit/sec. The system costs $1,170.

The portable RS-232 Megabyte bucket cassette system, which is shock mounted and briefcase packaged for portable applications, provides an RS-232, RS-422 or current loop interface for applications in data transfer between systems, data logging, store-and-forward and field program loading. It costs $1,285.

The spokesman said the compact RS232 or 8-bit parallel Little Guy 2 portable minicassette system is also shock mounted and briefcase packaged and is useful for program loading, data transfer between systems, data logging and store-and-forward applications. It features a self-contained operating system, automatic error checking, buffered I/O and 200K-byte capacity per formatted tape. It costs $750.

ADPI, 815 Diana Drive, Troy, Ohio 45373.

COMPUTER CONSOLES, INC.
Booth C3818

Computer Consoles, Inc. will exhibit its Power 5 computer systems. The Power 5/20, which runs under the Unix operating system, contains 2M bytes of main memory, a 70M-byte disk drive, a 20M-byte cartridge tape drive, 16 ports and the firm's Office Power software package, the vendor said.

The Power 5/20 costs $52,050, according to the vendor.

Also shown will be the Power 6/32 computer system.

This mini, configured with 4M bytes of main memory, a 9-track tape controller, 340M-byte disk drive and 64 communications ports, with a Unix license, is priced at $224,100, the vendor said.

Other configurations range from 32 to 128 ports.

The Powerterminal to be exhibited is a compact (12.4-in. wide, 11.9 in. high, 11.6 in. deep), tilt-and-swivel, green phosphor intelligent terminal.

It is priced at $2,195, the vendor said.

Computer Consoles, 97 Humboldt St., Rochester, N.Y. 14609.

MICRO TECHNOLOGY, INC.
Booth C4260-4262

Micro Technology, Inc. has announced it will introduce three products: the MSV05 streaming tape controller for Digital Equipment Corp. Q-bus systems, the MX22 8-in. and 5¼-in. floppy disk controller for DEC's Unibus-based computers and the MXV24 Q-bus floppy disk controller.

According to a spokesman, the MSV05 is a single-board, dual-height controller with circuitry to emulate DEC's TSV05 subsystem. The unit is said to provide up to 45M bytes of backup capability, and it features block-mode direct memory access (DMA), a 16K-byte buffer and an enhanced DMA data path. The MSV05 is priced at $1,425.

Emulating two RX02 subsystems, the MX22 controller reportedly interfaces up to four floppy disk drives simultaneously, configured as either four 8-in. drives, four 5¼-in. drives or two 8-in. and two 5¼-in. drives. Internal diagnostics are said to verify proper controller operation at initial power-up or under operator selection. The MX22 is priced at $1,045.

The MXV24 controller is a dual-size, DEC RX02-compatible system that can support both 8-in. and 5¼-in. drives on the Q-bus. It features 22-bit addressing and built-in diagnostics. Its price is not yet available.

Micro Technology, 1620 Miraloma Ave., Placentia, Calif. 92670.

MICRO-TERM, INC.
Booth C3946

Micro-Term, Inc. will display its Twist dual-format CRT terminal, which is said to be able to display data in both 80-col. by 24-line format and 80-col. by 72-line format.

The dual-format mode reportedly permits the Twist terminal to display 16- by 20-dot characters in the 80-col. by 24-line mode and to use a 7- by 9-dot format in full-page mode. Full-page mode permits 5,760 char. to be displayed on a single page, Micro-Term said.

The Twist terminal reportedly operates in the Ansi 3.64 mode and is compatible with Digital Equipment Corp.'s VT102 model, with the exception of the 132-col. mode.

Non-Ansi users may use the terminal in a custom mode, according to a vendor spokesman.

The Twist terminal is priced at $1,595.

Micro-Term, 512 Rudder Road, Fenton, Mo. 63026.

INNOVATIVE DATA TECHNOLOGY
Booth B3838

Innovative Data Technology has announced three ½-in., 9-track 800/1,600 bit/in. tape subsystems for the small computer systems interface (SCSI) bus standard.

The tape subsystems reportedly utilize an intelligent controller embedded behind two of their tape transports and in a stand-alone 3½-in. chassis when used with a streaming recorder. Variable data block sizes are programmable in both read and write modes up to a maximum of 32K bytes buffer size, the vendor said.

Other features reportedly include

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hardware and software compatibility with any host unit or other peripheral supporting the SCSI standard bus, the ability to control up to four ¼-in. tape transports, SCSI standard and optional tape-command support.

The three subsystems range in price from $6,495 to $8,495, according to the vendor.

Innovative Data Technology, 4060 Morena Blvd., San Diego, Calif. 92117.

APPLIED DATA COMMUNICATIONS, INC.
Booth C3364-C3366

Applied Data Communications, Inc. has announced it will exhibit its Trans/Media 500 turnkey media translation system.

According to a spokesman, the Trans/Media 500 system does not require other equipment to perform the conversions necessary to transport programs, text and data bases across system boundaries. Its Zilog, Inc. Z-80 host microprocessor is bused to 64K bytes of random-access memory and 4K bytes of erasable programmable read-only memory and controllers for floppy disk drives, magnetic tape drives, 10M-byte hard disks and line printers.

The processor is also linked to four serial asynchronous I/O ports, with a fifth port to drive the system keyboard. The system is designed to handle a variety of data formats and is programmable in the company's Trans/Media Basic. The base price for the Trans/Media 500 system is $15,800.

Applied Data Communications, 14272 Chambers Road, Tustin, Calif. 92680.

PANASONIC INDUSTRIAL CO.
Booth C3588

Panasonic Industrial Co. will introduce a family of three 3½-in. microfloppy disk drives that reportedly offer an unformatted storage capacity of 250K bytes, 500K bytes and 1M byte.

The JU-312, JU-322 and JU-362 are 32mm high. The drives are 104mm wide and 161mm deep. Prices range from $125 to $200, depending on the mode.

Panasonic will also announce six 3-in. floppy disk drives and associated disk media. Named the EME-102/202, EME-150/250 and EME-130/230, the drives offer unformatted storage capacities ranging from 250K bytes to 1M byte, the vendor said.

All the drives are said to be plug-compatible with popular 5¼-in. floppy disk drive interfaces. Prices range between $125 and $200 each, depending on the model.

Panasonic, One Panasonic Way, Secaucus, N.J. 07094.

FUJI PHOTO FILM USA, INC.
Booths B3315-B3317

Fuji Photo Film USA, Inc. has announced it will demonstrate its 3½- and 3-in. floppy disks and its recently announced 5¼-in., 1.6M-byte, high-density floppy disk.

According to a spokesman, the 3½- and 3-in. floppy disks, which are scheduled for fall shipment, feature a hard plastic shell resistant to bending and scratching; an automatic metal shutter mechanism on the head window; a sliding write-protect notch; and a hub ring. The 3½-in. disk offers a recording capacity of up to 1M byte and costs $5 to $5.50, and the 3-in. disk offers a recording capacity of up to 500K bytes and costs $6.

Fuji's 5¼-in., high-density floppy disk is said to offer a storage capacity equivalent to that of an 8-in., double-sided, double-density disk. The product has a maximum recording density of 9,650 bit/in., and modulation on each track is reportedly kept to 3%. It is initialized with the IBM format for 8-in. disks and is compatible with existing 8-in. disk software and controllers by installing a 5¼-in., 1.6M-byte drive unit. It costs $8.50.

Fuji Photo Film USA, Magnetic Products Division, 350 Fifth Ave., New York, N.Y. 10118.

COMPUTER COMMUNICATIONS, INC.
Booth B4115-4117

Computer Communications, Inc. (CCI) will display its 8274 remote cluster controller.

The controller reportedly connects a maximum of 40 IBM 3178 terminals with a coaxial cable at a distance of up to 5,000 ft. The controller completes Ascii to Systems Network Architecture 3270 protocol conversion for devices connected by an RS-232 port, CCI said. According to the vendor, the product con-

tains a Motorola, Inc. 68000 microprocessor, 64K bytes of read-only memory (ROM), 128K bytes of programmable ROM and adapter cards.

The controller's cost ranges from $5,775 to $7,000.

Computer Communications, 2610 Columbia St., Torrance, Calif. 90503.

ANN ARBOR TERMINALS, INC.
Booths A1826, A1920

Ann Arbor Terminals, Inc. has announced that it will demonstrate its family of Ansi standard and graphics terminals.

According to a spokesman, the terminal family includes the Genie, an Ansi standard, on-line editing terminal featuring a 15-in., nonglare screen, 30-line display, 36 programmable key levels, a data line monitor and diagnostics. The Genie+Plus terminal is an editing and form-filling unit that includes all the features of the Genie terminal.

In addition, Genie+Plus offers a standard scrollable 60-line memory for multiple-page operation, 60 programmable key levels, a nonvolatile control string for storing user functions and full printer output to an RS-232 printer. The Ann Arbor Ambassador terminal includes all the features of the Genie+Plus and full-page display capability. The Ann Arbor Graphics Master controller is said to enhance the Ambassador to provide high-resolution graphics in an integrated unit.

The Ann Arbor Graphics Master is priced at $3,090, and pricing for the Ambassador and Genie models begins at $1,195.

Ann Arbor Terminals, 6175 Jackson Road, Ann Arbor, Mich. 48103.

ESPIRIT SYSTEMS, INC.
Booth B3732

Espirit Systems, Inc. will introduce its ESP 6110 VDT.

According to a spokesman, ESP 6110 is an addition to Espirit's ESP Series, which will also be exhibited. Features of the terminal include tilt-and-swivel display; a low-profile, sculptured keyboard with numeric keypad; a 14-in. video display with a 9- by 11-dot character matrix; block, conversational and monitor modes; and character-oriented, programmable video attributes including blink, blank, reverse video, underlining and high/low intensity display at every character position.

Options include a bidirectional auxiliary port interface for connection to a local hard-copy or data input device. The port option also includes either RS-422 for data integrity at high bit/sec rates and long distances or a conventional current loop interface. The ESP 6110 is priced at $495.

Espirit Systems, 100 Marcus Drive, Melville, N.Y. 11747.

AMPEX CORP.
Booth A1034

Ampex Corp. has announced it will introduce the Centaurus family of 14-in. Winchester disk drives.

According to a spokesman, the three rack-mountable Centaurus disk drives will provide either 330M, 660M or 825M bytes of unformatted capacity and will offer an average access time of less than 25 msec using a linear voice-coil actuator in a closed-loop dedicated servo system.

The Centaurus disk drives are said to feature a direct-drive dc spindle motor, a built-in tester, universal ac power supply, automatic spindle/carriage locks and a storage module drive interface with dual-port capabilities. All models are said to be equipped with an exclusive control panel that permits off-line test and diagnostic functions without the need for external test equipment.

The products are called the Centaurus Model 330, which costs $3,300; the Model 660, which costs $6,600; and the Model 825, which costs $8,250. Deliveries for the Centaurus disk drives are scheduled for September.

Ampex, 401 Broadway, Redwood City, Calif. 94063.

PHILIPS PERIPHERALS, INC.
Booths D4226-D4228

Philips Peripherals, Inc. will exhibit two of its GP300 family printers. The GP300 printers are dot matrix units that operate at 300 char./sec in draft mode and 80 char./sec in high-resolution mode. They use 18 wire print heads.

The GP300L includes a single-sheet paper inserter,

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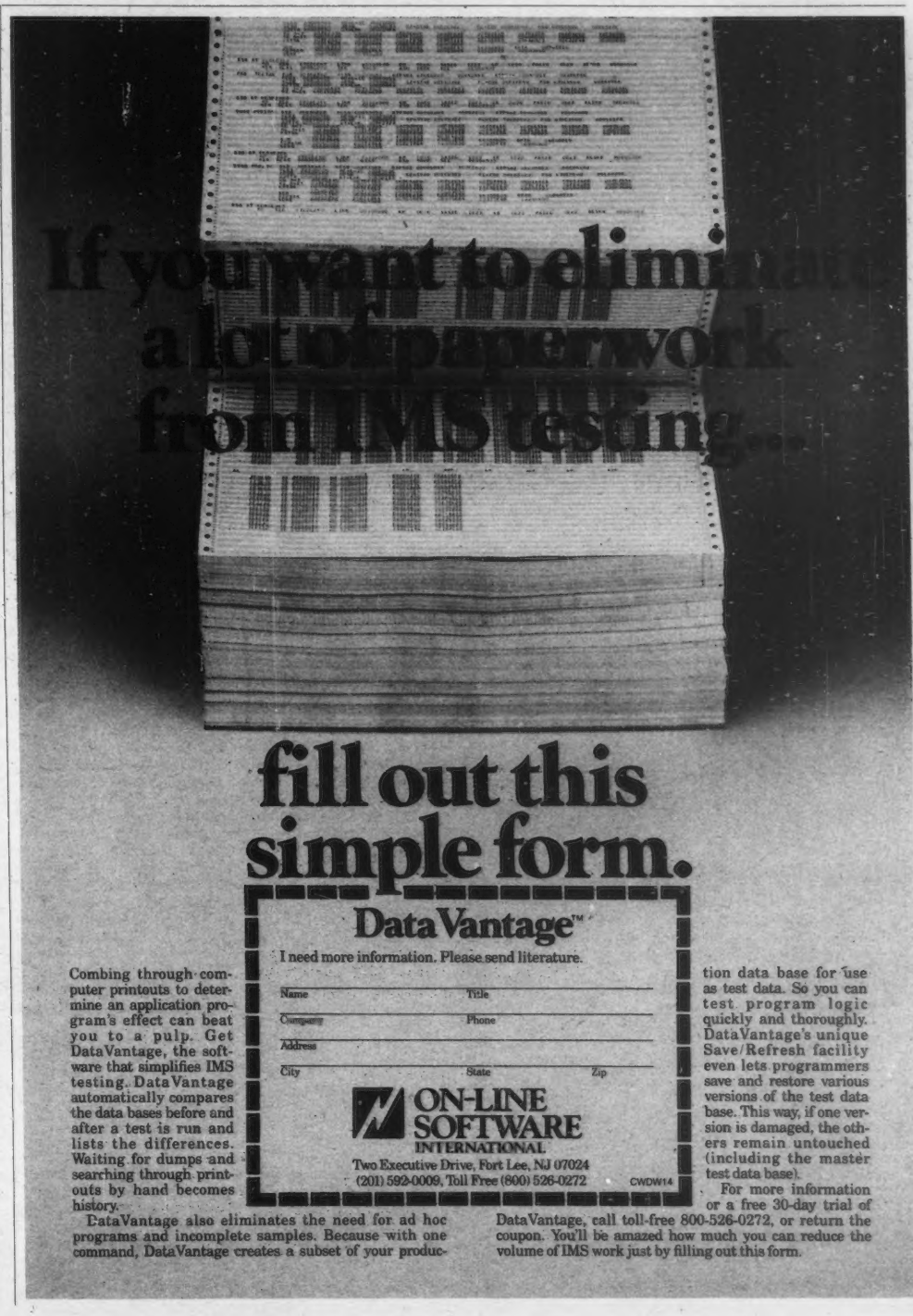

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144 by 144 dot/in. for graphics and each of the two standard character sets have 11 different languages' special symbols. Price of the GP300L is $2,995.

A color version of the GP300L is called the GP300LC. This model costs $3,395.

In addition, Philips will introduce the Elpho 20, an electrophotographic printer. The Elpho 20 can combine text with graphics at up to 600 by 600 dot/in. Priced in OEM quantities, an Elpho 20 with controller costs $12,500, and without controllers, costs $7,500.

Philips Peripherals, 385 Oyster Point Blvd., Unit 12, San Francisco, Calif. 94080.

DIGITAL DATA SYSTEMS, INC.
Booth A2437

Digital Data Systems, Inc. has announced memory boards said to be compatible with Digital Equipment Corp. and Data General Corp. hardware.

Add-on memory subsystems with capacities up to 32M bytes in a 15¾-in. chassis are available for DEC's LSI-11, PDP-11, PDP-11/70 and PDP-15.

The 1M-byte board for the Q-bus system is $1,195, and the 1M-byte board for the Unibus system is $1,900.

The DG-compatible memory board can be used in the DG Nova 1200 Models 2, 3, 4 and all models of the Eclipse, according to the vendor. The 1M-byte board for the Eclipse costs $5,700, and the 1M-byte board for the Nova 4 costs $4,900.

Digital Data Systems, 1551 N.W. 65 Ave., Plantation, Fla. 33313.

TELERAY
Booth A1858

Teleray, a division of Research, Inc., will display two recently announced terminals, one featuring Honeywell, Inc. and Digital Equipment Corp. compatibility and one with DEC and Tektronix, Inc. compatibility.

The Model 7-HNY is said to be an alternative to the Honeywell VIP7300 series of terminals. With DEC VT102 compatibility, users of Honeywell and DEC CPUs can use the device to communicate between systems.

It includes two bidirectional RS-232 ports, expanded line drawing and mosaic character sets and keyboard-entered, setup parameters. It reportedly has 12 preprogrammed function keys and a 512-char., nonvolatile memory that will accept up to 32 variable-length, user-programmed functions.

Available in 9-, 12- and 15-in. CRT sizes, the Model 7-HNY costs $1,695 in the 12-in. version.

The Model 7-GRF, the second recently announced terminal, is said to offer DEC VT102 compatibility in one mode and Tektronix 4010 and 4014 compatibility in a second mode. According to Teleray, its control sequences can be redefined from keyboard to computer system to be compatible with other asynchronous systems.

It costs $2,490.

Other terminals that Teleray is displaying are the Model 16-APL four-page or eight-page APL/Ascii editing terminal; the Model 7-DDG with DG D200 and DEC VT102 compatibility; and the Model 100-DHZ, a DEC VT100-compatible unit with a selectable Hazeltine Corp. 1510-compatible mode.

The Model 16-APL costs $1,645, while the Model 7-DDG and the Model 100-DHZ each cost $1,525.

Teleray, Box 24064, Minneapolis, Minn. 55424.

RICOH CORP.
Booth H534

Ricoh Corp. has announced that it will be exhibiting its LP 4120 tabletop laser printer, which is said to be capable of printing 12 page/min.

The LP 4120 is said to weigh 112 pounds, and it employs Ricoh's LP Controller 120, which has two 128-char. internal fonts in bold face and letter gothic style. The LP Controller 120 also allows for changing of two additional 128-char. fonts and provides the printer with overlay and portrait and landscape conversion capabilities.

The spokesman said interfaces are available for connecting the LP 4120 printer to a variety of office automation products, including word and data processors, electronic mail devices, local-area network systems and microcomputers. The LP 4120 laser printer, including the LP Controller 120, is priced at $14,000.

Ricoh, 5 Dedrick Place, West Caldwell, N.J. 07006.

DAA GENERAL CORP.
Booth A1522

Data General Corp. will demonstrate its recently announced GW/10000 and GW/8000 graphics workstations. The units were designed for the scientific and technical markets and can support computer-intensive operations for mechanical design and engineering analysis applications.

DG will also demonstrate a range of compatible hardware and software, service support and training products. These include the 32-bit Eclipse, MV family of superminicomputers, graphics workstations and Desktop Generation microcomputers. Software packages, including multiterminal and vertical applications, will also be demonstrated.

The exhibit will also feature DG's Comprehensive Electronic Office (CEO) and the Comprehensive Financial Operations software package and multivendor connecting options for the CEO system, including the IBM Personal Computer, Northern Telecom, Inc.'s Displayphone and Wang Laboratories, Inc.'s word processing systems.

DG, 4400 Computer Drive, Westboro, Mass. 01580.

PERTEC PERIPHERALS CORP.
Booth C4398

Pertec Peripherals Corp. will exhibit its Vindicator FS 1511 drawer, mountable, autoloading ½-in. streaming-tape drive.

According to a spokesman, the FS 1511 is a dual-density unit offering both 1,600 and 3,200 char./in capacities. It is said to provide up to 92M bytes of unformatted storage capacity in the streaming mode, and it offers Pertec's microformatter interface and Ansi- and IBM-compatible recording formats for data interchange.

The spokesman said Vindicator's Variable Extended Gap feature provides a maximum gap length in eight selectable increments between 0.6 and 10 inches within which streaming operation can be maintained.

The desired increment reportedly allows the user to maximize system performance by optimizing the throughput-to-capacity ratio. The FS 1500's price will be announced at the show.

Pertec, 9600 Irondale Ave., Chatsworth, Calif. 91311.

TERMINAL DATA CORP.
Booth H1224

Terminal Data Corp. will exhibit the Videomate VMT-1010 raster scan display module and the Videomate VMT-3010 intelligent image-manipulation workstation.

The VMT-1010 has a 15-in. monitor said to display flicker-free images of test, documents, raster graphics and other high-density raster-scanned data. The display screen is said to support up to 2,200 active scan lines refreshed in a 2:1 interlaced mode with a 68-KHz horizontal scan rate. The vendor said up to 1,400 active scan lines can be refreshed in a noninterlaced mode with a 96-KHz horizontal scan rate.

The VMT-1010 is priced at $1,740, the vendor said.

The VMT-3010 is said to display steady, flicker-free images of text, documents, raster graphics and other high-resolution or high-density raster-scanned data.

Using Intel Corp. Multibus architecture, the VMT-3010 can be interfaced with a Winchester disk, high-resolution printer and other peripherals, according to the vendor spokesman.

The VMT-3010 is priced on an OEM basis at $16,840, the vendor said.

Terminal Data, 21221 Oxnard St., Woodland Hills, Calif. 91367.

MEGATAPE CORP.
Booth C4362

Megatape Corp. will introduce two 500M-byte streaming tape drives, both using book-size cartridges of ½-in. magnetic recording tape.

The full-width model, MT-2210, and the half-width model, MT-2220, both reportedly feature the ability to read and write data on the firm's 300M-byte cartridges, which have 1,000 feet of tape. Both also operate in a 200- or 50 in./sec streaming mode and at 50 in./sec in the start-stop mode, Megatape said.

A 24-track, serpentine format is reportedly employed in each unit. Data is transferred at a rate of 240K byte/sec.

The MT-2210 is priced at $5,500, and the MT-2220 is priced at $5,850.

Megatape, 1041 Hamilton Road, P.O. Box 317, Duarte, Calif. 91010.

SPECTRA LOGIC CORP.
Booths A2122-A2124

Spectra Logic Corp. will announce two controllers for use with Texas Instruments, Inc. tape drives and disk drives.

The Spectra 126 was designed for use with TI's 990 and BS 600/800 minicomputer series.

It emulates TI's CD1400, DS80/300 and WDMT disk and TI 979 tape subsystems. The Spectra 126 is a single-board controller said to be compatible with TI's DX10 operating system and diagnostic software.

It attaches any combination of storage module drive-type disks and up to four ½-in. tape drives, a spokesman said. It is said to support transfer rates of up to 2M bit/sec with disks and 800K bit/sec with tape.

It will be available this month for $6,000.

The Spectra 116 is a single-board, single-function disk controller, said to offer the Spectra 126's disk features.

The Spectra 116 also will be available this month and costs $5,000, the vendor spokesman said.

Spectra Logic, 1227 Innsbruck Drive, Sunnyvale, Calif. 94089.

JUKI INDUSTRIES OF AMERICA, INC.
Booths A2644-A2646

Juki Industries of America, Inc. will display its letter-quality daisywheel printers.

The Model 6100 operates at 18 char./sec and has a 13-in. platen. The interface is a Centronics Data Computer Corp. Centronics Parallel, with RS-232C serial interface available as an option. The Model 6100 costs $599.

In addition, Juki will show its Model 6300 with a printing speed of 32 char./sec, with a maximum speed of up to 40 char./sec. It has a Diablo Systems, Inc. Diablo 96 character daisywheel, with the Centronics Parallel or RS-232C serial interface. The Model 6300 has a 16-in. platen and will be available in October 1984 for $1,000.

Juki Industries of America, 299 Market St., Saddle Brook, N.J. 07662.

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TELEFILE COMPUTER PRODUCTS, INC.
Booth C4236

Telefile Computer Products, Inc. will display several printers and a terminal system.

On display will be the T2465 laser printer, which reportedly combines 800 line/min. printing with high-resolution graphics capabilities.

Also to be shown will be the T2425 matrix printer, which is said to print letter-quality characters at 100 char./sec. The T2425 can also print draft copies at 192 char./sec, according to the vendor.

The firm's Series 2000 terminals, also to be shown, are said to offer emulation of the IBM 3270 and Digital Equipment Corp. VT100/102 terminals. Included is a display of 80- to 132 columns and 22 user-programmable function keys.

The Series 2000 is priced in versions ranging from $640 to $1,995. The T2465 laser printer is priced at $28,500 with controller, and the T2425 matrix printer is priced at $2,295.

Telefile Computer Products, 17131 Daimler St., Irvine, Calif. 92714.

PRINTRONIX, INC.
Booth C4166

Printronix, Inc. will display several printers, among them the Models 4160, MVP 150B and its Dataprinter series of band printers.

The Dataprinter series of band printers — Models DP 600, DP 750, DP 1000 and DP 1200 — reportedly offer self-test and diagnostic display, changeable print band, a switch to select form length and the choice of 6 or 8 line/in.

The MVP 150B reportedly offers a Centronics Data Computer Corp.-compatible parallel interface with microcomputer protocols, a 224-char. character set, forms length selector and an antistatic brush, among other features, according to the vendor.

The 4160 reportedly offers a Centronics-compatible parallel interface, an Ascii 96-char. character set, a paper-out detector and a 6 or 8 line/in. selector.

The Model 4160 is priced at $5,380. The MVP 150B is priced at $3,745.

The Dataprinter models are offered at the following prices: DP 600, $9,400; DP 750, $10,400; DP 1000, $11,800; and DP 1200, $12,800.

Printronix, P.O. Box 19559, 17500 Cartwright Road, Irvine, Calif. 92713.

LANPAR TECHNOLOGIES, INC.
Booth 3421-3423

Lanpar Technologies, Inc. will introduce an addition to its Vision series of CRT terminals.

The Model 2200 Plus is said to combine compatibility with Digital Equipment Corp.'s VT220 terminals and incorporate features of earlier Vision series terminals.

The performance of the Model 2200 Plus is reportedly enhanced by a multipage feature that permits an operator to program the length and width of individual pages, mixing 80- and 132-col. formats on forms from one to 97 lines deep.

The vendor's Intelligent Function System provides access to six levels of preprogrammed functions by touching one key, enabling the operator to switch applications without reloading function-key contents. A total of 64 preprogrammed function keys are available.

Its price is $1,195.

Lanpar Technologies, 85 Torbay Road, Markham, Ont. L3R 1G7.

INFORMATION ENTRY LTD.
Booth B3812

Information Entry Ltd. will unveil enhanced versions of its portable desktop computer terminals.

The Multipad terminals reportedly allow untrained personnel to have direct and controlled access to real-time computer operation.

The Multipad terminals are also said to allow application documents to be laid out on interchangeable paper or plastic sheets. The documents can reportedly become task-designed custom keypads tailored to the type of job and the computer literacy of the operator.

Up to 225 documents are reportedly able to be coded uniquely and recognized automatically by the terminal.

Information Entry, 1415 W. 21st St., Tower A, Oakbrook, Ill. 60521.

Continued on Preview/32

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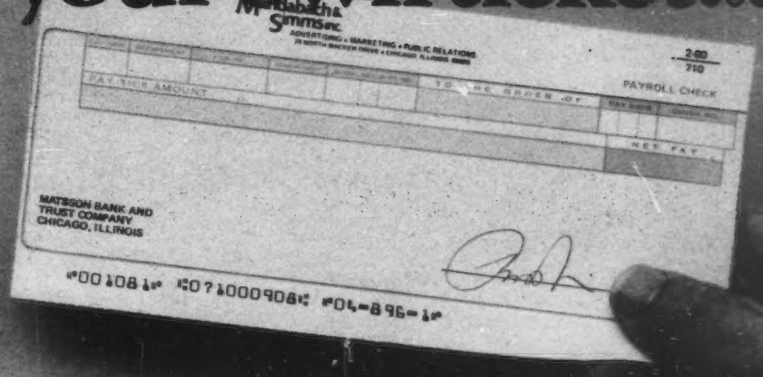

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Continued from Preview/31

ZETACO
Booth D33906

Zetaco, the controller division of Custom Systems, Inc., will introduce the BMX-2 magnetic tape coupler that interfaces high-performance tape drives with Data General Corp.'s 32-bit Eclipse and MV series superminicomputers via a burst multiplexer channel (BMC).

The 15-in. by 15-in. board is plug-compatible with DG's Federal Communications Commission-compliant chassis as well as its old-style chassis, according to the vendor.

The BMX-2 is said to emulate the DG 6026 and 4307 tape subsystems and is software-compatible with DG's Rdos, AOS and AOS/VS operating systems. A mix of up to eight tape drives under the 6026 and up to four drives under the 4307 is said to be supported by the BMX-2.

The BMX-2 has a transfer rate capability of up to 2M byte/sec, the vendor said. The product also features a 1K-byte, first-in, first-out buffer and BMC and data channel latency and extensive self-test with LED status reporting, the vendor said. Memory addressing capability is said to be up to 64K-byte words.

The BMX-2 is priced at $1,995 in single quantities, the vendor said.

Zetaco, 6850 Shady Oak Road, Eden Prairie, Minn. 55344.

CAMBRIDGE DIGITAL SYSTEMS
Booth C4214

Cambridge Digital Systems, an integrator of Digital Equipment Corp. Q-bus and Unibus systems, will display its 256K-byte System 94.

The System 94 can support up to 32 users. It features 1M byte of dual-ported memory; a 12-port multiplexer module; a 70M-byte, 8-in. Winchester disk drive; and a 45M-byte cartridge tape drive for backup. Prices for the System 94 start at $9,100, and customized configurations are available for up to $20,000.

Also exhibited will be the System 58, a four-user system that provides 512K bytes of dual-ported memory, four serial ports, 20M or 40M bytes of Winchester disk storage and a 1M-byte, 8-in. floppy disk. This 5¼-in. package can be a desktop, rack or floor-mountable system. Prices range from $9,100 to $20,000, depending on configuration, and include 256K-byte memory and four serial lines.

Other customized PDP-11 and VAX configurations will be shown that begin at $10,000 and sell for as high as $150,000.

Cambridge Digital, P.O. Box 568, 65 Bent St., Cambridge, Mass. 02139.

MICROPOLIS CORP.
Booth D3000

Micropolis Corp. will introduce its 1350 series of 5¼-in. Winchester disk drives, which are said to be compatible with most Enhanced Small Device Interface controllers.

According to a spokesman, the company's Models 1353, 1354 and 1355 drives offer capacities of 85M, 127M and 170M bytes and an average seek time of less than 30 msec. Evaluation units of the disk drives are scheduled to ship in the fourth quarter, and volume shipment is scheduled for the first quarter of 1985. Model 1353 will be priced at $1,469, Model 1354 at $1,669 and Model 1355 at $1,837.

Micropolis announced that it will also exhibit its 1450 series of 8-in. storage module drive Winchester disk drives, which reportedly offer capacities from 83M bytes to 332M bytes and average seek times of 20 msec.

Micropolis, 21329 Nordhoff St., Chatsworth, Calif. 91311.

ELECTRONIC MACHINE CORP.
Booth H534

Electronic Machine Corp. will display the Pixel 300, an intelligent controller system for laser printers.

The Pixel 300 uses a Motorola, Inc. 68000 microprocessor to accept data from the host computer or word processor through an RS-232 or parallel port. The controller, using characters from its font memory, reportedly compares the input data on a bit map, which is located on a video board. The video board then outputs the bit map in a raster mode to the laser printer.

The Pixel 300 can be configured to three levels of performance. In a standard configuration, with three boards for the 18 to 60 page/min range, the printers will be offered for about $3,000 in quantities of 500 and will be available in the third quarter of 1984.

Electronic Machine, 417 Suite 500, S. Hill St., Los Angeles, Calif. 90013.

MICROCOSM, INC.
Booths H539-H540

Microcosm, Inc. will be demonstrating its line of in-circuit emulators for Intel Corp.'s family of microprocessors, including the 8086, 8088, 80186 and 80188.

According to a spokesman, the emulators feature host independence, allowing them to run on the IBM Personal Computer, Compaq Computer Corp.'s Portable Computer, Intel's Intellec Series III and Digital Equipment Corp.'s VAX-11 processors under both DEC's VMS and AT&T's Unix. The products' Advanced Human Interface feature reportedly couples the emulator hardware with the user's host facilities, providing a dedicated development system.

Microcosm's emulation hardware to be demonstrated includes the Ebase86 emulation base ($4,995); the PM86 probe module ($1,995); the PM88 ($1,995); the PM186 and PM188 ($3,495 each); and the Cmodule communications module ($495).

Microcosm, 14355 S.W. Allen, Beaverton, Ore. 97005.

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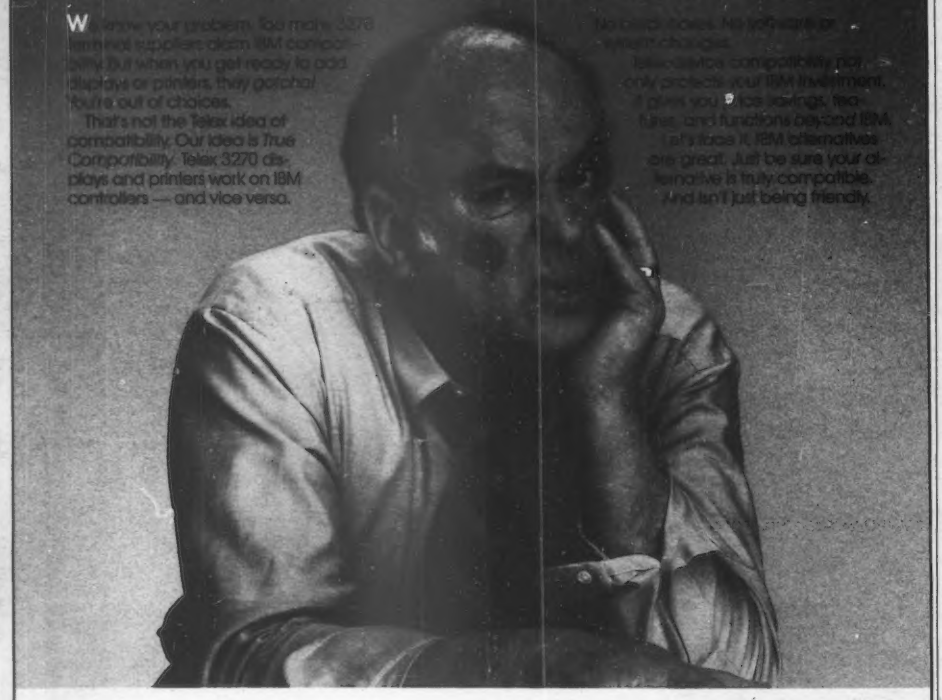

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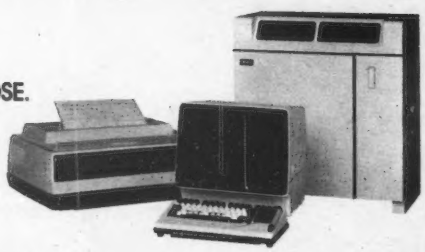

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FACIT, INC.
Booth C4108

Facit, Inc. will display its newly announced VDT that features a rotating screen to format both horizontal and vertical documents in word processing applications.

When rotated to its vertical position, the Twist terminal reportedly enables users to create a 72-line full page on one screen. This reportedly eliminates the need to print out a copy to examine the full-page format.

The Twist unit features a 15-in., high-resolution asynchronous Ascii-standard video terminal with a large display format: 24 lines by 80 characters in the horizontal position or 72 lines by 80 characters in the vertical position. The terminal is priced at $1,595.

The company will also introduce demand document versions of three printer models: the 4544 four-color printer ($4,695), 4542 two-color printer ($3,996) and 4528 single-color printer ($1,595).

In addition, the firm will display its IBM Personal Computer-compatible 4512 letter-quality printer ($995) and its 4560 ($895) and 4565 ($1,595) daisywheel printers.

Facit, 235 Main Dunstable Road, Nashua, N.H. 03061.

EMULEX CORP.
Booth A2524

Emulex Corp. said it plans to introduce Javelin, a small computer systems interface (SCSI)-based desktop, mass storage packaged subsystem. This subsystem connects through an independent host adapter to a variety of CPUs, including the Digital Equipment Corp. Q-bus and Unibus and the Intel Corp. Multibus. It also can be used with IBM's Personal Computer and Personal Computer XT and compatible microcomputers.

The Javelin includes an integral power supply, cooling fan, pertinent controller boards and a choice of two 5¼-in. footprint storage peripherals. The storage devices can be two 5¼-in. Winchester disk drives or one disk drive and one ¼-in. streaming cartridge tape drive for storage and backup. Each Winchester disk can range in capacity from 46 to 140M bytes (unformatted).

Separate host adapters are available. Each acts as an intelligent interface between the Javelin SCSI interface and the appropriate CPU bus structure.

The Emulex Javelin Model ED2/70-T includes the 86M-byte, 5¼-in. Winchester disk drive packaged with the ¼-in. streaming cartridge tape drive. List price for this unit is $7,725, with quantity discounts available.

Also displayed will be Titleist, Emulex's SCSI-based tape controller for microcomputer subsystems. This tape controller was specifically designed to interface with the Cipher Data Products, Inc. Cipher 540, a ¼-in. streaming cartridge tape drive with the SCSI using the new QIC-24 media format.

Employed in combination with independent host adapters, the Titleist can interface through the SCSI bus to a variety of CPUs, including the DEC Q-bus and Unibus, the Intel Multibus, and the IBM Personal Computer and Personal Computer XT bus structures.

Titleist supports full SCSI arbitration for up to eight host and/or peripheral devices, including disconnect/reconnect capability. This allows devices performing time-consuming tasks to release the bus temporarily and reconnect when the command has been completed. Other devices can then use the bus while these tasks are being performed.

List price for the Titleist is $435.

In addition to these products, Emulex will also show its Host Adapter IB01 for IBM Personal Computer users. The IB01 contains a protocol controller on the board that implements full SCSI protocol. Since the SCSI protocol does not distinguish between mass storage device types, a variety of SCSI-based disk or tape drives can be attached to the Personal Computer without having to modify the operating system software. This provides the user with device independence and eliminates the need for different software drivers for each storage device.

The IB01 board comes in three versions. Version 1 includes Emulex's programmable read-only memory (Prom) with optional software driver and disk utilities written and supported by Emulex for $395. Version 2 also contains Prom and operates in a manner fully transparent to the IBM Personal Computer software for $395. Version 3 is the IB01 board without the Prom and without software driver or utilities. This version is packaged for OEMs who will provide their own Prom and utilities. The price of Version 3 is $345.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

CENTURY DATA SYSTEMS
Booth A144

Century Data Systems will display its line of OEM disk memory products composed of 8-in. and 14-in. disk drives. The 8-in. disk drive features a 25M-byte capacity in a removable cartridge format and over 50M bytes in a fixed disk format. The 14-in. disk drives include three fixed disk units for storing 315M bytes, 513M bytes and 590M bytes, respectively, and a disk drive for a 315M-byte removable disk pack, the vendor said.

OEM pricing ranges from $6,400 to $9,990, according to the vendor.

Century Data Systems, P.O. Box 3056, 1270 N. Kraemer Blvd., Anaheim, Calif. 92803.

ADVANCED BUSINESS COMPUTER SYSTEMS INTERNATIONAL, INC.
Booth D4313

Advanced Business Computer Systems International, Inc. will display an automated cash register/business microcomputer designed for wholesale and retail merchants.

Cashcom 100 reportedly was designed to operate simultaneously as a programmable cash register, inventory controller and business microcomputer. As a point-of-order sales system, it provides similar functions to those offered by sophisticated cash registers, including bar code entry, the vendor said.

As a computer, the unit provides a variety of clerical services such as inventory reports, accounting, mail lists, invoice generation and word processing, the vendor said. The system offers local-area network and modem interface with other Cashcom 100 systems and host computers such as Digital Equipment Corp.'s VAX-11/780, Hewlett-Packard Co.'s HP 3000 and IBM's 4341.

Prices start at $3,500.

Advanced Business Computer Systems International, P.O. Box 32524, Detroit, Mich. 48232.

FUJITSU AMERICA, INC.
Booth A2416

Fujitsu America, Inc. will unveil the M3071 and M3072 desktop laser printers.

The M3071 is an integrated printer module which uses laser electrophotography for printing and halogen lamp electrophotography for copying and scanning. The M3072 was designed for printing only and comes with a controller, random-access memory, font cartridges and a power supply.

Both M3071 and M3072 can perform letter-quality printing using laser electrophotography, which is performed at 300 and 240 dot/in. respectively. The first print appears 17 seconds after data is transmitted, the vendor said.

In addition, in a scanning mode, the M3071 can use a sliding document board to scan a document. The unit can then reproduce the document as video signals for processing, the vendor said.

An optical-image overlay feature is also available on the M3071. Information from the external controller and information on the sliding document board can be merged into a single document by combining the laser and halogen lamp optics systems.

The M3071 will be available the end of July at a cost of $7,340. The M3072 will be available at the same time at a cost of $7,865. Both units will be available in OEM quantities, the vendor said.

Fujitsu America, 3055 Orchard Road, San Jose, Calif. 95134.

APPLIED MEMORY TECHNOLOGY
Booth C4089

Applied Memory Technology has announced a computer-based automatic test system said to be capable of performing a final test on up to 32 Winchester disk drives while logging and analyzing results.

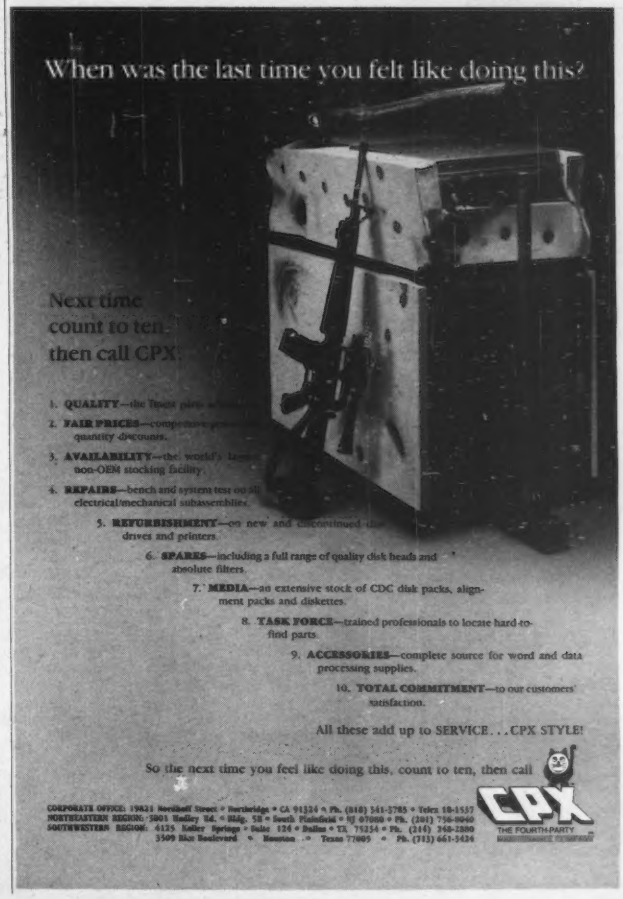
The system, called Model DX525AT/S, runs a series of linked tests on the standard ST506-type tape drives simultaneously, independently and asynchronously, the vendor said. The tests are preprogrammed in software, which can be modified.

The system includes a central console with an IBM Personal Computer XT, floppy disk drive, printer and up to four test bays of eight testers each. In operation, programs stored in the Personal Computer XT are downloaded to the individual testers. Each tester can be started and stopped independently, and each offers automatic or manual modes.

Test segments run in the automatic mode include status, revolutions per minute measurement, format, window margin, flaw map generation and error rate.

The system is priced at $43,050.

Applied Memory Technology, 2822 Walnut Ave., Tustin, Calif. 92680.



SPERRY CORP.
Booth 4C-4088

Sperry Corp. plans to demonstrate the Sperrylink office system, which includes a Desk Station Model 30, 8439 Diskette subsystem, 0431 daisy-wheel printer and Distributed Office Processing Station (Dops)/20.

The system combines personal computer, electronic mail and voice functions, Sperry said. The 8439 diskette subsystem reportedly stores 655K bytes of data on 5¼-in. diskettes. The printer works at a speed of 55 char./sec.

The base price for Desk Station Model 30 is $3,530. A typical clustered system serving 15 users and including Dops/20, diskette subsystems, printers and software would average $8,552 per user.

Sperry Computer Systems, P.O. Box 500, Blue Bell, Pa. 19242.

GENERAL ROBOTICS CORP.
Booth C3942

General Robotics Corp. will introduce several products said to be compatible with the standard Digital Equipment Corp.'s LSI-11 and Q-bus products and provide support for 22-bit addressing.

The MSV11-Q is a 1M-byte memory module available in both a standard version and a high-performance version. The high-performance version is 40% faster than the standard version. The price of the MSV11-Q is $3,950 for the standard version and $4,950 for the MSV11-QH high-performance release.

Also, the firm said it plans to introduce the DHV11, an asychronous direct-memory access multiplexer. The unit is said to provide 64-line communications control for RS-232 devices. External plug panels allow implementation of the DHV11 in 16-line increments. The DHV11 multiplexer is priced at $4,000, which includes controller, multiplexer and a 16-port plug panel. Additional 16-port plug panels are available for $3,000 each.

The BA800/L chassis was designed to accommodate a system configuration that includes an LSI-11/73, 4M bytes of memory, 64 serial I/O ports, an 80M-byte Winchester disk drive and a streaming tape subsystem. Price of the BA800/L chassis is $3,250.

Also, the firm said it will announce the STV11 streaming tape controller for ¼-in. cartridge tape drives with the QIC-02 interface to support the standard DEC TS-11 emulation. Reportedly, in TS-11 streaming mode, 20M bytes of data can be copied in five minutes. The price is $1,450 for the STV11 streaming tape controller.

In addition to these products, General Robotics will display a combination 5¼-in. fixed/removeable Winchester subsystem that has 5M-byte removable storage and from 15M to 45M bytes of fixed storage emulating multiple DEC RL02 devices. The combination will cost $6,695.

The Python/32 Single Board Mainframe will be unveiled. This product is based on the National Semiconductor Corp. NS32032 32-bit CPU and includes a separate hardware floating-point processor, 4M bytes of dual-ported, error-correcting code random-access memory, a disk controller for interfacing two disk drives, a tape controller for two ¼-in. streaming tape drives and communications control for up to 64 asynchronous lines. Unix is the primary operating system. The Python/32 is priced at approximately $60,000 in single quantities and approximately $30,000 in OEM quantities as a board-level product.

General Robotics, 57 N. Main St., Hartford, Wis. 53027.

VIA WEST, INC.
Booths B3215-B3217

Via West, Inc. will be demonstrating DD-1, a Centronics Data Computer Corp. standard parallel communication switch designed to allow two printers to use one port.

The product features a transparent parallel data format, 36-pin female Amp, mating connecting Amp and locking hardware, Via West said.

DD-1 costs $49, and 1-, 3- and 5-ft cables are available from the company.

Via West, 534 N. Stone Ave., Tuscon, Ariz. 85705.

XEBEC
Booth A2134

Xebec plans to display its S2410 hard disk controller, which combines enhanced small device interface (Esdi) and small computer system interface capabilities on a single board.

The S2410 supports up to four Edsi-interfaced disk drives with 5M- or 10M-byte data rate and is designed for systems that require multiple host and disconnected operating facilities, Xebec said. The controller reportedly supports hard disks with more than 50M bytes of storage, closed-loop servo positioning and average access time of less than 30 msec.

S2410 costs $295.

Xebec, Suite 600, 2055 Gateway Place, San Jose, Calif. 95110.

CIPHER DATA PRODUCTS, INC.
Booth C4118

Cipher Data Products, Inc. has announced its Series M990/M991 group code recording (GCR) Cachetape tape drives and its 540S streaming cartridge tape drive.

The M990 and M991 are half-inch, group code recording devices offering storage capacities of up to 180M bytes on standard 10½-in. reels, according to the company. They are intended for use in the minicomputer and superminicomputer markets.

Dual-density versions offer 1,600 or 6,250 bit/in., while tridensity models offer the additional density of 3,200 bit/in. The M990 reportedly features a cache of 128K bytes and a maximum transfer rate of 450K byte/sec. The M991 is said to have a 256K-byte cache and a 790K byte/sec transfer rate.

The 540S is a ¼-in. streaming cartridge tape drive using the SCSI interface and featuring the OIC-24 format standard.

It is said to provide up to 60M bytes of data storage on a standard ¼-in. tape cartridge.

Scheduled for delivery during the third-quarter 1984, the dual and tridensity M990 are priced at $6,000 and $7,000 and the dual and tridensity M991 at $7,000 and $8,000. The 540S is available now for $940, with formatting, controller and other options increasing the price to $1,400.

Cipher Data Products, 10225 Willow Creek Road, San Diego, Calif. 92138.

IBEX COMPUTER CORP.
Booth A2225

Ibex Computer Corp. said it will announce an intelligent IBM-format-compatible nine-track streaming tape drive.

The PCT-1000 was designed to provide up to 138M bytes of backup for Winchester disks, read/write access to archival data banks and intercomputer data interchange.

The unit reportedly is available in vertical-mount and drawer-mount configurations and uses two microprocessors and a real-time operating system to control tape motion.

The drawer-mount unit is said to be 19 in. wide and 5¼ in. high and to handle standard 7-in., 8½-in. and 10½-in. tape reels. It reportedly offers a variety of formats, including 800 char./in., 1,600 char./in. and dual-density 3,200/1,600 char./in.

According to the vendor, the price varies according to the number of formats specified, with the basic PCT-1000 1,600 char./in. drawer-mount unit priced at $2,256 in quantities of 100.

Ibex, 20741 Marilla St., Chatsworth, Calif. 91311.

INTERDYNE CO.
Booth C3436

Interdyne Co. will display a 3½-in. tape drive, the Model ID1010. The 10M-byte drive utilizes the vendor's single reel, self-threading and fixed heading technology, the company said.

Using standard ½-in. tape, the single reels are upward compatible from the vendor's 5M- to 20M-byte model tape drives, the vendor said. The 5M-, 10M- and 20M-byte models use the SA450/SA300 floppy interface, while the 40M-byte version uses the SA850 floppy interface.

The ID1010 is priced at $450.

Interdyne, 157 Topaz St., Milpitas, Calif. 95035.

CENTRONICS DATA COMPUTER CORP.
Booth C3830

Centronics Corp. will display the Printstation 240 series of 24-pin dot matrix printers. The speed is 80 char/sec. in a letter-quality mode and 160 char/sec. in a draft mode. An operator-installable feature is a single bin sheet feeder in two versions, 80 column and 132 column. The Printstation 240, designed for the microcomputer and small business system markets, will be available in evaluation quantities priced at $1,495.

The Printstation 250 series is an 80-col. dot matrix printer with standard four- or seven-color printing. It was designed to work with mainframes and terminal systems.

Evaluation units will be available in July for $1,299.

Centronics' Printstation Model 354 is a 220 char/sec. printer designed for word processing applications. Pin-addressable graphics is standard in densitites of 72 by 72 or 144 dot/inch. List price of the basic unit is $2,195.

Centronics Data Computer, One Wall St., Hudson, N.H. 03051.

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DATAGRAPHIX, INC.
Booth B3824

Datagraphix, Inc. intends to display its Model 9820, a nonimpact laser printer that prints at a speed of 21,000 line/min.

The product reportedly can print page formats of 6, 8, 10 or 12 line/in. and 10, 12 or 15 char./in.

The user can select character styles from 34 standard fonts, with any four fonts intermixed within a report, Datagraphix said.

The printer's font editor permits design of special characters or logos for personalized letterheads, forms and mailing labels, according to the company.

Model 9820 costs $322,000.

Datagraphix, P.O. Box 82449, San Diego, Calif. 02138.

ALPHA DATA, INC.
Booth A1146

Alpha Data, Inc. will be announcing an addition to its Atlas family of disk drives which features a storage capacity of 160M bytes. The company will also be exhibiting the Winchester-style, 128M-byte Atlas disk drive. Both feature an average 18 msec access time (3,600 rpm rotation speed) and a 1M-byte cylinder size.

Other Atlas features are an integral spindle/brushless dc motor, a retractable head design, sealed disk chamber, Ansi/storage module device interface and a 19-in.-wide rack mounting with slides for all standard-size racks.

The price for the 128M-byte Atlas disk drive is $8,000, the vendor said.

Alpha Data, 20750 Marilla St., Chatsworth, Calif. 91311.

KENNEDY CO.
Booth A1344

The Kennedy Co. will unveil an 8-in. Winchester disk drive, the 73160, and a new 5¼-in. streaming cartridge transport, the Series 6500.

The 73160 Winchester drive reportedly features a rotary actuator, composite heads and unformatted capacity of 165.9M bytes of storage.

The 73160 has six platers with 10 data surfaces and one servo surface, the vendor said.

The Series 6500 streaming cartridge transport reportedly offers 16K-byte buffer storage, two-track stepping heads and a formatted capacity of 60M bytes with 600-ft cartridges and 45M bytes with 450-ft cartridges.

Time to back up 60M bytes is reportedly 12 minutes.

The Model 73160 is priced at $4,695 and the Series 6500 is priced at $1,275, the vendor said.

Kennedy, 1600 Shamrock Ave., Monrovia, Calif. 91016.

CADO SYSTEMS CORP.
Booth C3856

Cado Systems Corp. will be showing its line of Tiger ATS multiuser, multitasking computer systems. These three systems are software-compatible, allowing use of any of Cado's 300 applications programs.

The Tiger ATS 16 is said to support up to 16 terminals or other devices and uses an Intel Corp. 80186 microprocessor. Price of the Tiger 16 is $12,895 for standard configuration.

Tiger 32 and Tiger 36 each use a hierarchy of three 16-bit Intel 8086 and 8089 microprocessors which share the processing load. They support up to 32 or 36 terminals or other devices, respectively. Prices for the Tiger 32 and Tiger 36 are $27,540 and $36,545, respectively, for standard configuration.

Cado Systems, 2055 W. 190th St., Torrance, Calif. 90504.

MICRODATA CORP.
Booth C3566

Microdata Corp. will feature its M1000 line of workstations and its Natural language processor. The M1000 line reportedly combines the company's relational data base management system with a range of office automation functions which can be run simultaneously.

Also to be displayed are the company's All distribution management and All financial management software packages. The All distribution management package operates with the firm's 4700, 7000 and 9000 computer systems and includes applications for purchase order processing, inventory control, order entry/invoice processing and sales analyses.

The All financial management package reportedly is a fourth-generation language designed to implement, main-

Continued on Preview/36

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Continued from Preview/35

tain, document and execute business applications in a function and data field-oriented environment.

The M1000 workstations are priced at $7,595, the Natural language processor is priced at $2,500, the All financial management system and the All distribution management system are both $3,000.

Microdata, 17481 Red Hill Ave., Irvine, Calif. 92714.

CUSTOM SYSTEMS, INC.
Booth D3306

Zetaco, the controller products division of Custom Systems, Inc., will exhibit three peripheral controllers compatible with Data General Corp. minicomputers.

The three interfaces are: the ZDF-1, a disk/tape controller compatible with DG's Nova and Eclipse series; the BMX-1, a Storage Module Drive (SMD) disk drive controller that interfaces with DG's Burst Multiplexer Channel (BMC), and the BMX-2, a tape drive controller, also compatible with DG's BMC.

The ZDF-1 controls disk and tape drives from a single board, using technology from Zetaco's Model 295 disk controller and Model 133 tape coupler, with dedicated microprocessors for each function. The ZDF-1 is priced at $4,195 singly, the vendor said.

The BMX-1 is a single-board disk drive controller that supports up to four SMD disk drives on DG's BMC. The BMX-1 is priced at $4,995 singly, the vendor said.

Model BMX-2 is a magnetic tape coupler with transfer rates of 1.2M byte/sec that allows integration of tape drive technologies including Group Coded Recording and tridensity drives, according to the vendor. The BMX-2 is priced at $1,995 singly, the vendor said.

Custom Systems, 6850 Shady Oak Road, Eden Prairie, Minn. 55344.

SGS SEMICONDUCTOR CORP.
Booth D4522

SGS Semiconductor Corp. will exhibit its Samson 32-bit, 16-bit, multiuser, multitasking computer system, which includes dual-port memory, Intel Corp. Multibus compatibility and distributed microprocessors for all I/O controllers.

The system is said to support from nine to 33 users and contain a 70M-byte hard disk drive with 67M-byte block-addressable magnetic tape cartridge drive. Communications packages by SGS include Telex Plus, IBM 3780 protocol software, Digital Equipment Corp. VAX-to-Samson software and Hewlett-Packard Co. 3000 series-to-Samson software.

SGS has written its own C compiler for the system. Other software includes Ryan McFarland's RM/Cobol and Basic, the vendor said.

The price of a Samson 10 user system is $24,900, according to the vendor.

SGS Semiconductor, 1000 E. Bell Road, Phoenix, Ariz. 85022.

DATA SYSTEMS DESIGN, INC.
Booth H518

Data Systems Design, Inc. will unveil a family of 5¼-in. Winchester and ¼-in. tape subsystems for Digital Equipment Corp.'s Q-bus computers.

Dubbed the Cyclone family, the products will operate on the DEC PDP-11/23, 11/73, Micro/PDP-11 and Microvax systems. They will be available in either a rack-mounted or tabletop Stacpac version, a vendor spokesman said.

The subsystems will be offered in capacities ranging from 36M bytes to 120M bytes of formatted storage. They will be fully compatible with DEC's Digital Storage Architecture, the spokesman said,

The rack-mounted version consists of Winchester and tape units in a 5¼-in. chassis. Its controller/interface is a single, quadwide board.

The subsystems range in price from $8,990 to $12,590 and are available in a variety of configurations.

Data Systems Design, 2241 Lundy Ave., San Jose, Calif. 95131.

ZOLTECH CORP.
Booth A2303

Zoltech Corp. will exhibit the first members of its VQ-11 family of Q-bus computer system packages, intended for system integrators and OEMs specializing in Digital Equipment Corp. Q-bus hardware and compatible software.

A standard VQ-11 modular package consists of a 250W switching power supply, an eight-slot quadwidth Q-bus card cage, dual fans, front panel controls and a modular frame said to allow over 150 combinations of floppy disks, Winchester disk drives and tape drives to be mounted within the box, according to the vendor.

The eight-slot Q-bus card cage is said to be large enough to accommodate DEC PDP-11/21, 11/23 and 11/73 series. At the same time, it will still have room for several megabytes of memory and controllers, the vendor said.

The VQ-11/Model 302 will be the heart of a family of application-oriented workstations to be marketed by the company to end users with specialized applications. Those applications would include computer-aided design, computer-aided manufacture data acquisition, signal processing and automatic testing, according to a company spokesman.

The price of a typically-configured VQ-11/Model 302 system, including two RXO2 emulating floppy disks, a Winchester disk drive emulating RLO2 disks for a total of 20M bytes, a DEC PDP-11/23, 256K bytes of random-access memory as well as four serial I/O ports, is $7,620.

Zoltech, 7023 Valjean Ave., Van Nuys, Calif. 91406.

Continued on Preview/37

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SOLOSYSTEMS, INC.
Booth C4450

Solosystems, Inc. will be exhibiting the 1116 Solostation for mainframe programmers, which gives users multitasking, multiwindowing integrated software engineering featuring Solosystem's eight software engineering tools.

The company's Solos operating system is said to give users access to 16 automatic soft keys, which remember the last 16 commands the user has keyed in. The Solos tools include utilities for file management, a Help facility, an on-line user's manual and a communications facility, which is said to let the Solostation serve as an interactive communications terminal and/or let the user transfer files between the host mainframe and the Solostation.

The 1116 Solostation hardware contains seven microprocessors, including two Motorola, Inc. 68010 processors, the vendor said. The Solostation operates with 1M byte of main memory, plus 256K bytes of random-access memory for the high-resolution, bit-mapped display. Data storage is in either two 5M-byte cartridge disk drives or in a compact external 40- or 50M-byte drive.

The price for the 1116 Solostation varies by configuration but is approximately $20,000, the vendor said.

Solosystems, 3025 Orchard Pkwy., San Jose, Calif. 95134.

GENICOM CORP.
Booth C3308

Genicom Corp. will announce two shuttle matrix printers that operate at speeds of 300 line/min and 600 line/min, respectively.

The 4000 series includes Models 4410 and 4440. The models incorporate a patented resonant print module system with three printing modes: draft, near-letter-quality and graphics/plotting, the vendor said.

The printers are available with standard serial and parallel interfaces and reportedly have been designed for high-throughput, heavy-duty cycle printing operations. Among the units' features are dual six-pin tractors, 20 in./sec paper slew, multiple character sets, 17 international character sets, draft printing, automatic bold and underline printing, automatic superscripts and subscripts, download characters and bar codes, the vendor said.

Prices for the 4000 series range from $5,700 to $7,000.

Genicom, One General Electric Drive, Waynesboro, Va. 22980.

ROYAL BUSINESS MACHINES, INC.
Booth A1622

Royal Business Machines, Inc. has introduced a 60-page/min electronic printer targeted to large minicomputer and mainframe installations.

The 8800 reportedly uses an ion deposition imaging system to sharpen reproductions. It is available with a library of four fonts. The maximum on-line font memory is four character sets. The printer accepts 1,500 sheets of 16 to 24 lb standard bond paper and various types of letterhead, colored paper, address labels and transparencies.

According to the company, a forms generator graphics capability prints most common business forms, eliminating the need for preprinted forms. The 8800 reportedly features a 240-by 240 pixel/in. dot matrix, yielding 57,600 dots per sq. in.

The 8800 will be available for delivery during the third quarter of 1984 at a price of $70,000 to $80,000, depending upon options ordered.

Royal Business Machines, 500 Day Hill Road, Windsor, Conn. 06095.

BELL & HOWELL CO.
Booth H412

Bell & Howell Co. will unveil a printer subsystem that reportedly can provide wet or dry, on-line, cut microfiche in less than 60 seconds.

The 6600 computer output microfilm (COM) is said to be self-contained and able to cut microfiche at speeds faster than comparable COM devices. The unit is supported by a data buffering system that prints a full page at one time and internal processing that handles multiple blocks of information.

The 6600 utilizes a Digital Equipment Corp. PDP-11 minicomputer and Bell & Howell software; a 6601 COM printer, tape drive, dual floppy disk drives plus hard-copy and CRT terminals. The 6600 is priced at $121,900, including software.

The vendor will also introduce an optional tape drive for its COM systems. The STC 2920 tape drive is integrated into the vendor's tape subsystem that includes tape transport, formatter/controller, power supply and resident microdiagnostics.

The tape subsystem is reportedly capable of reading and writing all Ansi-compatible nine-track tape in either 1,600 bit/in. or 6,250 bit/in. recording formats. Price is $42,500.

Bell & Howell, 16691 Hale Ave., Irvine, Calif. 92714.

FALCO DATA PRODUCTS, INC.
Booth B4538

Falco Data Products, Inc. has introduced Fame 100, a terminal that emulates Digital Equipment Corp.'s VT100 and VT52 model terminals.

Fame 100 reportedly handles 24 lines by 80 or 132 char., with a 25th line providing status information. The terminal features a 256K-byte input buffer and 18 user-programmable function keys, each of which can store 600 bytes of information.

Fame 100 costs $1,195.

Falco Data Products, 1286 Lawrence Station Road, Sunnyvale, Calif. 94089.

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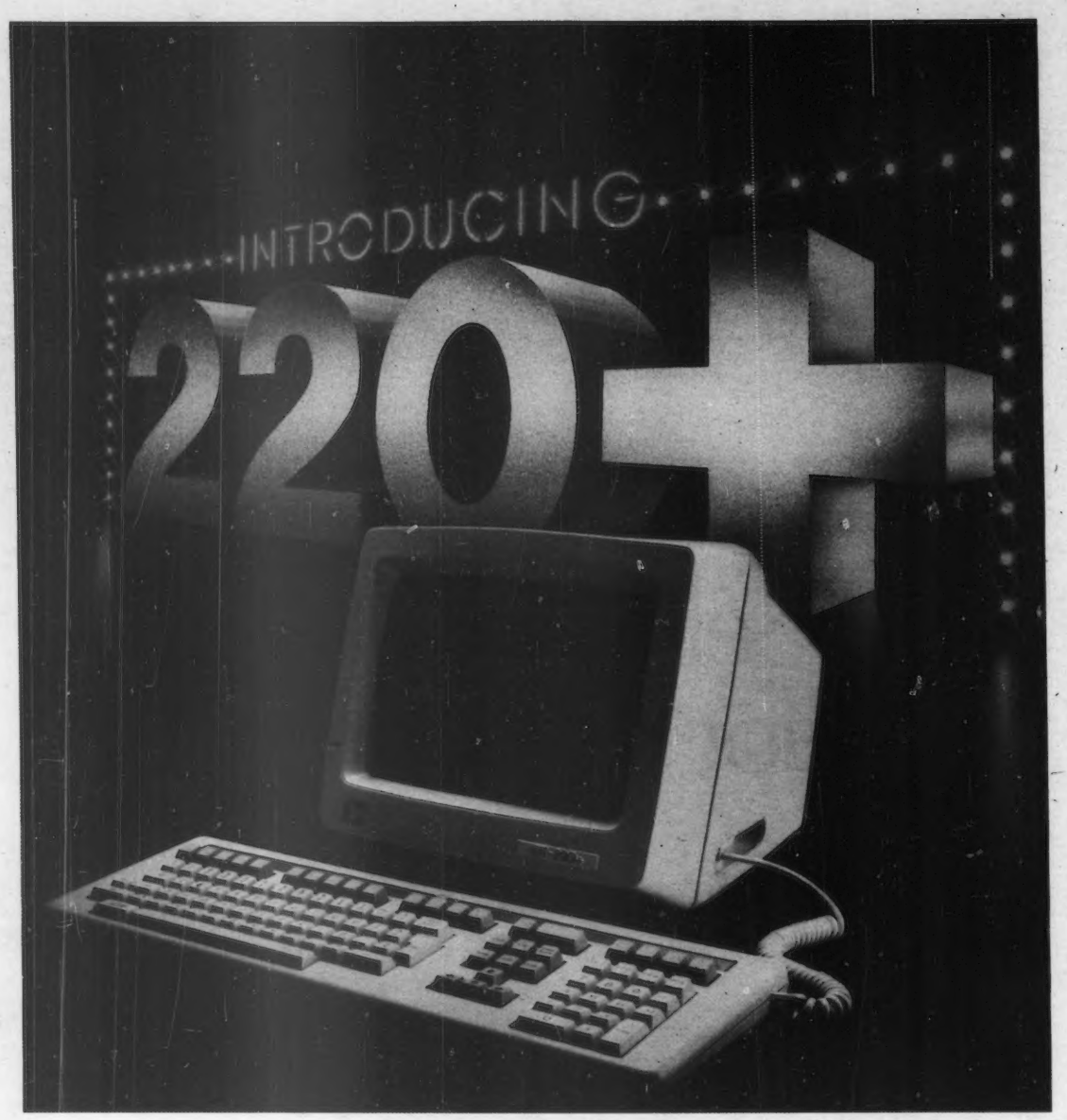

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MICROCOMPUTERS at NCC

DATAPOINT CORP.
Booth A2316

Datapoint Corp. plans to display Vista-PC, a color personal computer that emulates Datapoint terminals or operates as a stand-alone system.

The microcomputer uses an Intel Corp. 80186 microprocessor, features 256K bytes of random-access memory (expandable to 1M byte), supports 20M bytes of hard disk storage, runs Microsoft, Inc.'s MS-DOS operating system and includes a graphics monitor, Datapoint said.

Bundled with the system is ColorPac, a Datapoint software product that acts as a seamless interface between various applications, according to the vendor.

Vista-PC costs $4,795.

Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

DIGITAL RESEARCH, INC.
Booth A2324

Digital Research, Inc. will exhibit many products, including Fortran 77, a full-featured implementation of the Ansi 1977 (X3.9-1978) standard programming language.

Fortran 77 is a native code compiler for microcomputers that is compatible with a family of Digital Research languages. It features large program support and optimization of small programs, 64K-byte element arrays, math coprocessor hardware support and overlay capability, according to the vendor.

Also on display will be other products, including Presentation Master, Starlink and Concurrent PC-DOS, the vendor said. Presentation Master, priced at $1,995, offers a method of producing high-resolution color slides and prints from computer graphics. It combines DRdraw and DRgraph software programs, the vendor said.

Starlink, priced at $1,695, is a combination of hardware and software that is said to expand a single IBM Personal Computer into a multiuser system.

Concurrent PC-DOS, priced at $295, is an operating system said to increase the power and versatility of the IBM Personal Computer. The vendor said it can run up to four IBM PC-DOS or CP/M application software programs at one time.

Digital Research, P.O. Box 579, 160 Central Ave., Pacific Grove, Calif. 93950.

VOTAN
Booth C3772

Votan plans to demonstrate the VPC 2000 voice card, an expansion system that provides an IBM Personal Computer with voice recognition, speech generation and telephone management capabilities.

The product reportedly allows a user to incorporate voice capabilities into application packages without changing the package. A user may define 64 voice utterances that are linked to sequences of up to 30 character keystrokes, according to Votan. The product is said to allow a user to speak in normal conversational tone without pausing between words.

VPC 2000, priced at $2,450, consists of a printed-circuit board that plugs into an IBM Personal Computer bus slot, a microphone, a speaker and software.

Votan, 4487 Technology Drive, Fremont, Calif. 94538.

AVATAR TECHNOLOGIES, INC.
Booth C3180

Avatar Technologies, Inc. will unveil a new protocol converter, the PA100 Turbo, for IBM Personal Computers that allows users to capture data from IBM mainframes and transforms the data for use in Personal Computer applications.

The PA100 Turbo allows the IBM Personal Computer to emulate a variety of IBM 3278 and 3270 terminals by connecting coaxially to an IBM 3274/76 cluster controller supporting IBM Binary Synchronous Communications or Systems Network Architecture/Synchronous Data Link Control environments, the company said. The Turbo reportedly provides three modes of access to the mainframe: data capture, file transfer and terminal emulation.

Data capture permits the Personal Computer to act as an IBM terminal to capture full screens of data or selective portions of the screen. Data can be captured to the microcomputer's disk, directly to an attached printer or saved in the Personal Computer's memory for quick recall, Avatar said.

With optional host resident software, file transfer is accomplished with a menu-driven approach. The DP manager retains control over where files are transferred to safeguard data base integrity.

For terminal emulation, Turbo reportedly provides a built-in record and playback feature that permits users or the DP manager to create one-touch commands that can be put into memory for temporary storage or put permanently on disk. It is said to provide on-line Help screens that define Personal Computer keyboard equivalents to the 3270 terminal command and function keys.

In terminal emulation mode, users reportedly can run Personal Computer and host applications concurrently. When used in conjunction with data capture, this allows immediate use of mainframe data in Personal Computer applications without the need to log on and off constantly, Avatar said.

The PA100 Turbo is slated to cost approximately $1,300.

Avatar Technologies, 99 South St., Hopkinton, Mass. 01748.

MOSTEK CORP.
Booth A2066

Mostek Corp. has introduced MK68200, a 16-bit microprocessor that can act as an embedded standalone controller in single-chip mode or as an intelligent peripheral controller in expanded bus mode.

The chip features bit manipulation and extensive arithmetic and multiply and divide operations, Mostek said. Three 16-bit multimode timers reportedly provide interval timing, pulse width measurement and generation and bit/sec rate generation.

A read-only memory version of MK68200 costs $25, while an emulator version is priced at $75, according to Mostek.

Mostek, 1215 W. Crosby Road, Carrollton, Texas 75006.

Continued on Preview/40

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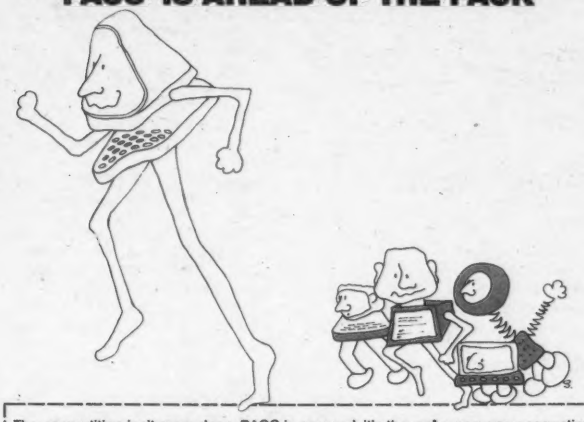

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Continued from Preview/39

SPECTRA COMPUTER SERVICES LTD.
Booth A2542

Spectra Computer Services Ltd. plans to demonstrate Property Master, a property management system that runs on an IBM Personal Computer with IBM's PC-DOS operating system.

Property Master reportedly allows a user to manage one office tower, one shopping center or 100 residential units.

It features building and unit management, menu-driven data entry, rent collection reporting, vacancy and lease expiring reports and user-defined description codes for buildings, units and tenants, Spectra said.

Property Master costs $5,000.

Spectra Computer Services, 1510-363 Broadway, Winnipeg, Man., Canada R3C 3N9.

WANGTEK
Booth H512

Wangtek will unveil two new 5000E drive interfaces said to be compatible with the IBM Personal Computer and Small Computer Systems Interface (SCSI) standard. These controller and formatter boards are being offered to OEMs for the Wangtek half-height 5000E ¼-in. cartridge tape drives.

Boards for IBM Personal Computer compatibles will be available immediately in evaluation quantities. Larger quantities will be available within 45 days of the show at a price of $375 each in quantities of 500.

SCSI-compatible boards are available in evaluation quantities now and will be available in greater quantities within 45 days, the company said. SCSI-compatible boards will cost $395 each in quantities of 500.

Also displayed will be Wangtek's QIC-02-compatible board, available for $310 each in quantities of 500. These boards are immediately available.

Wangtek, 41 W. Moreland, Simi Valley, Calif. 93065.

CHERRY ELECTRICAL PRODUCTS CORP.
Booths A2100-A2102

Cherry Electrical Products Corp. has introduced Cherry Keyboard, a wireless 84-key keyboard for the IBM Personal Computer and PCjr.

Cherry Keyboard differs from the IBM Personal Computer keyboard by placing shift and return keys in convenient locations, Cherry Electric Products said. In wireless, simplex mode, the keyboard transmits at a distance up to 20 feet, according to the vendor. Data transmission reportedly is sent to an infrared receiver that plugs into the keyboard jack on the microcomputer.

Cherry Keyboard has a price of $190; the keyboard and receiver cost $275.

Cherry Electrical Products, 3600 Sunset Ave., Waukegan, Ill. 60087.

UNISOURCE SOFTWARE CORP.
Booth C4214

Unisource Software Corp. will display the Sundown 5¼-in., 10M-byte Winchester hard disk, which allows IBM Personal Computer users to upgrade to Personal Computer XT capacity and run Venix/86, a licensed implementation of the Unix operation system from Venturcom, Inc.

The Sundown plugs into a floppy drive slot on the IBM Personal Computer. Standard features of the Venix/86 operating system are a hard disk partition to permit Venix/86, PC-DOS and MS-DOS files and programs, C compiler, Basic, electronic mail and a variety of file management utilities.

Single-unit price for a Sundown disk with single-user Venix/86 is $2,095.

Unisource Software, 71 Bent St., Cambridge, Mass. 02141.

DIGI DATA CORP.
Booth C4126-C4128

Digi Data Corp. plans to introduce the Model 70 PC, a 16.5M-byte cartridge tape backup system for the IBM Personal Computer.

The product includes the cartridge system, tape controller and software drivers, Digi Data said. The device reportedly includes a menu-driven software package that allows a user to select files from a disk for backup. With assembler or Basic programming languages, the user can also customize the file backup process.

Model 70 PC costs $1,700.

Digi Data, 8580 Dorsey Run Road, Jesup, Md. 20794.

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MEGATEL COMPUTER CORP.
Booth A2542

In addition to demonstrations of its existing line of single-board computers, Megatel Computer Corp. will introduce its Quark/300 single-board system.

Quark/300 offers between 128K- and 256K-bytes of random-access memory (RAM), a hard disk controller, a video controller, programmable read-only memory expansion capabilites, a Zilog, Inc. Z80B processor, a floppy disk controller, parallel and serial I/O and a peripheral expansion bus, according to a spokesman. The components reportedly are contained on one 4- by 7½-in. board.

Prices for Quark/300 range from $495 to $895, depending on order quantity and the amount of RAM. Quark/300 will join the Quark/100, Quark/150 and Quark/200 family of single-board computers.

Megatel, 150 Turbine Drive, Weston, Ontario, Canada M9L 2S2.

ITW CORTRON
Booths A1442-A1444

ITW Cortron, a division of Illinois Tool Works, Inc., will display an IBM Personal Computer-compatible keyboard, a touch-screen device and a cursor director.

The FC2500 keyboard reportedly includes an 83-key layout and a detachable serial interface. It also is said to meet a 30mm height requirement and to feature surface-applied legends, matte-finish stepped sculptured keytops, auto repeat, +5V dc operation and selectable bit/sec rates and output format. Targeted to the OEM market, it costs $245 in quantities under 10.

The Cyclops touch-screen device reportedly uses a technique employing a grid of light beams monitored by a scanning detector, which allows a built-in microprocessor to determine the position of the operator's finger. The device was designed for use with various computer terminals, computer-aided design and manufacturing (CAD/CAM) workstations and copying machines. It is available for $85 in quantities of 10,000.

The Beetle cursor director reportedly consists of a stationary housing and a spherically shaped control, which can be deflected to move the cursor correspondingly on the screen. It was designed for use with word processing, text, graphics, spreadsheet, menu selection and CAD/CAM applications. The device costs $50 in quantities of 10,000.

Cortron, 400 W. Grand Ave., Elmhurst, Ill. 60126.

GIMIX, INC.
Booth B4016

Gimix, Inc. will introduce its 15-user C language development system, featuring its GMX 6809 CPU III, said to protect against program crashes by using memory attributes and trapping of illegal instructions.

The development system is said to include intelligent serial I/O boards to reduce system overhead and to allow user terminals to be run at up to 19.2K bit/sec. It also reportedly includes 1M byte of Cmos static random-access memory, a 72M-byte hard disk drive and a 6M-byte hard disk drive with removable pack.

The total system costs $18,868.

Gimix, 1337 W. 37th Place, Chicago, Ill. 60609.

CDEX CORP.
Booth A1048

Cdex Corp. will unveil two training software packages that run on IBM Personal Computers and compatibles.

Analyzing Financial Statements (AFS) using electronic spreadsheets and Analyzing Businesss Investment Opportunities (Abio) using electronic spreadsheets are the latest products in the vendor's business application series. The programs are priced at $69.95 each.

Each AFS and Abio package reportedly consists of instructional and template diskettes. AFS divides financial statement analysis into four steps: data gathering, financial strength examination, key ratios analysis and applying the information obtained to business decisions, the vendor said.

Abio reportedly teaches users how to perform a discounted cash flow analysis as a method for evaluating business growth opportunities.

The company will also demonstrate its PC Expert package, a tutorial for the IBM Personal Computer. PC Expert costs $139.95.

Cdex, 5050 El Camino Real, Los Altos, Calif. 94022

DATA TRANSLATION, INC.
Booth C4536

Data Translation, Inc. will display its linked analog I/O systems and array processor subsystems for microcomputers.

Jointly developed and marketed with Sky Computers, Inc., the DT3362 and DT3366 are 12-bit analog I/O systems on standard DEC quad-size cards, Data Translation said. The dual-port architecture of these boards reportedly permits data transfer over the external link or over the Q-bus. Maximum throughput is 250 kHz for the DT3362 and 400 kHz for the DT3366, according to the vendor.

The SKY320 is said to be a fixed-point digital signal processor designed for integer data processing. SKY320 architecture reportedly is based on a 5-MHz instruction cycle and a 16-bit microprocessor with arithmetic logic unit and multiplier (TMS320) that performs a 100- by 100-matrix multiply in 1.7 seconds.

Price of the DT3362 starts at $2,595; the DT3366's cost begins at $2,375. The SKY320 sells for $3,500.

Data Translation, 100 Locke Drive, Marlboro, Mass. 01752.

Continued on Preview/42

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BG 8/10

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Continued from Preview/41

TOSHIBA AMERICA, INC.
Booth D3922

Toshiba America, Inc. will show its letter-quality P1351 printer. Features of the P1351 reportedly include 24-pin printhead design to place overlapping dots in both letter and draft modes.

The 132-col. P1351 prints at 100 char./sec and draft copy at 192 char./sec. Dot-addressable graphics are produced at a density of 180- by 180 dot/in., Toshiba said.

Single pass printing in each of the three modes boosts throughput, particularly with underscores, bold type, superscript and subscript. The P1351 handles cut sheets and continuous forms from 4- to 15 in. wide, delivering one original and three copies, according to the vendor.

Friction roller feed is standard, and a pin feed tractor is optional. Also optional is Toshiba's proprietary hands-off sheet feeder for automatic edge sensing and collating.

The P1351 features standard Qume Corp. Sprint 5 emulation to connect to most popular microcomputers and word processors, Toshiba said. Also standard is an RS-232C interface. The P1351 is priced at $1,895.

Also exhibited will be an entry-level version of the firm's three-in-one line of printers. Called the P1340, the unit is said to produce letter-quality characters at 54 char./sec and draft quality documents at 144 char./sec. The unit prints graphics with a 180- by 180 dot/in. density. Features include software-selectable multiple fonts, pitches, line spacing, condensed print, proportional spacing and single pass printing. Qume Sprint 5 emulation is standard.

P1340 accepts sheets or continuous forms from 4½- to 10 inches wide. It reportedly can be connected to machines from IBM; Apple Computer, Inc.; Digital Equipment Corp.; Wang Laboratories, Inc.; Toshiba; and other microcomputers and word processors. Suggested retail price of the P1340 is $995.

Toshiba America, Information Systems Division, 2441 Michelle Drive, Tustin, Calif. 92680.

INTERTEC
Booth A1758

Intertec will introduce its Headstart video processing unit microcomputer family, designed for single and multiuser environments.

Headstart Models 128, 512 and 1000 reportedly all permit memory upgrades to 1M byte. Headstart is said to be contained in two enclosures: the CRT and detachable keyboard. It uses an 8-bit Zilog, Inc. Z80A processor and an Intel Corp. 8086 processor.

Basic internal memory capacities are 128K bytes for the Model 128, 512K bytes for the Model 512 and 1M byte for the Model 1000.

The Model 512 reportedly features a 500K-byte, single-sided, 3½-in. microfloppy disk drive, while the Model 1000 is provided with a 1M-byte double-sided disk. According to the company; the Model 128 was designed for use principally as a local-area network workstation.

The systems are said to include a 12-in. diagonal P31 phosphor nonglare screen with a 25-line by 132-col. or 80-col. user-selectable display. The operating systems are said to be Digital Research, Inc.'s CP/M 80, Microsoft, Inc.'s MS-DOS and the multiuser Intertec LAN-DOS.

According to Intertec, users can network up to 255 Headstarts into a local-area network featuring password generation, individual logon and logoff, programmable security access, time slicing and programmable video processing unit access priority.

The Headstart Model 128 is priced at $1,895, the Model 512 at $3,495 and the Model 1000 at $4,495.

Intertec, 2300 Broad River Road, Columbia, S.C. 29210.

ORANGE MICRO, INC.
Booth C4442

Orange Micro, Inc. will display a multifunction card called Mr. Chips and a parallel interface called the Chipmunk, both for the IBM Personal Computer.

Mr. Chips is said to offer nine features, including seven hardware functions. It includes parallel and serial ports and 64K bytes of random-access memory, expandable to 256K bytes, Orange Micro said.

The Chipmunk reportedly offers a parallel interface, clock and calendar and the firm's Chipdisk software.

Mr. Chips is priced at $449. The Chipmunk is priced at $145.

Orange Micro, 1400 N. Lakeview Ave., Anaheim, Calif. 92807.

NCR CORP.
Booth C3756

NCR Corp. will display its PCX expander kit for the IBM Personal Computer and compatible models.

The PCX reportedly combines alphanumeric with bar code acquisition capability and can act as a collection station for data from a manufacturing facility's shop floor. The product also has applications in attendance recording and project resource application, NCR said.

The PCX kit consists of a terminal communication card, a software driver, a demonstration program and an NCR 2840 data collection terminal, the vendor said. The 2840 reportedly includes a bar code wand, an alphanumeric keyboard, a 16-char. display and an optical badge reader.

The PCX kit is priced at $2,500.

NCR, Technology Marketing Division, 1700 S. Patterson, Dayton, Ohio 45479.

CIE SYSTEMS, INC.
Booth C3574

CIE Systems, Inc. will be displaying a number of products, including terminals, supermicrocomputers and printers.

The company's CIE-7800 terminal comes in two models. The minimum configuration of the CIE-7800 terminal is compatible with the IBM 3178 terminal and 3278 Model 2 display station, CIE said. The full-configuration CIE-7800 is compatible with all five models of the IBM 3278 terminal series, the vendor said. It is priced from $1,550 to $1,995.

The CIE Business Solutions Package is built around the vendor's 580/20 supermicrocomputer and comes with general accounting software. The system comes with 256K bytes of main memory, 10M bytes of Winchester disk storage, 500K bytes of floppy disk capacity for data backup and communications ports for three additional CRTs and one printer. Its price is $9,995.

The CIE-7850 terminal reportedly provides local intelligence, full IBM Personal Computer and Personal Computer XT functionality to the CIE-7800 and IBM 3178 and 3278 terminals. A dual floppy version is priced at $2,495, and a version with a single floppy and a hard disk is priced at $3,995.

The vendor will also display the 8510/1550SC serial dot-matrix printers, which are said to feature high-speed color enhancements of its 8510A and 1550A models. The printers are priced at $795.

Also featured will be the F-10-55 daisywheel printer, priced at $1,995.

CIE Systems, 2515 McCabe Way, Irvine, Calif. 92713.

GAVILAN COMPUTER CORP.
Booth D3932

Gavilan Computer Corp. has announced it will demonstrate its Gavilan mobile and Gavilan SC mobile microcomputers.

According to a spokesman, the Gavilan mobile computer is a 16-bit micro with 16-line display, battery operation and a fully integrated 3½-in. disk drive.

The product comes with 96K-byte Cmos.

Both the Gavilan and Gavilan SC, which offers a 64K-byte memory, weigh under 10 pounds and feature touch-panel input and the ability to run MS-DOS-compatible software, according to the spokesman for Gavilan.

Each has Cmos static random-access memory, a built-in modem, LCD and other low-power components, an optional docking printer and second disk drive and 5¼-in. data transfer drive for IBM Personal Computer data compatibility.

The Gavilan mobile computer is priced at $3,995; the Gavilan SC costs $2,995, according to the vendor spokesman.

Gavilan, 240 Hacienda Ave., Campbell, Calif. 95008.

TEXAS INSTRUMENTS, INC.
Booth A1544

Texas Instruments, Inc. will exhibit several products from its Data Systems Group. Included will be the 707 portable data terminal, a full-function teleprinter for business, priced at $695.

Speech Command will also be demonstrated. Priced at $2,600, Speech Command is a mix of hardware and software that combines speech processing, voice recognition and telephone management functions in a single unit fitting inside the TI Professional Computer, according to the vendor.

In addition, TI will show NaturalLink, a software package that reportedly allows users to ask questions by combining common English words and phrases into sentences that tell the computers what to do. NaturalLink is priced at $150, the vendor said.

Also displayed will be TI's NU Machine, a scientific and engineering workstation centered around TI's 32-bit Nubus technology.

NU Machine works under the Unix operating system and costs $36,240 in quantities of 25, according to the vendor.

Texas Instruments, P.O. Box 809063, Dallas, Texas 75240.

COMPUPRO CORP.
Booth A2166

Compupro Corp. will introduce what it claims is the first commercially available IEEE 696-compatible National Semiconductor Corp. 32016-based microcomputer.

The multiuser System 816/G is based on National Semiconductor's 6-MHz 32016 CPU, with a National Semiconductor NS16202 interrupt-control unit and NS16082 multiuser memory management unit. It also reportedly features 1M byte of 16-bit static memory (expandable to 16M bytes), 12 serial ports, one Centronics Data Computer Corp. printer port, one parallel port, 1.2M bytes of floppy disk storage, 40M bytes of hard disk storage and 2M bytes of solid-state disk storage.

The System 816/G is priced at $19,995.

Compupro, 3506 Breakwater Court, Hayward, Calif. 94545.

DBS INTERNATIONAL, INC.
Booth B3738

DBS International, Inc. will display the DBS-16 Desktop model computer. The Desktop is equipped with two disk drives for 5¼-in. floppy disks, with an option of one 5¼-in. Winchester drive and one floppy.

Configured for one user under Digital Research, Inc.'s CP/M 86, the Desktop is priced at $4,190, which includes one VDT. For two or more users, Desktop needs either the MP/M 86 operating system or Concurrent DOS. Price of the Desktop with MP/M 86 is $4,145, plus $695 for each terminal. With Concurrent DOS, the price is $4,190 and $695 for each terminal.

Another product exhibited will be the Deskside Stack model, which allows the Desktop to connect up to 28 users. The basic expansion box with MP/M 86 operating system and DBS Net software for four users is $5,315. Each slave card costs an additional $1,500 (4 user/card), and each additional terminal costs $695.

DBS International, Welsh Road and Park Drive, P.O. Box 425, Montgomeryville, Pa. 18936.

ADAPTEC, INC.
Booth D3310

Adaptec, Inc. has announced that it will feature a wide variety of its Winchester disk controller products.

Among the products, a spokesman said, is the ACB-4000 Small Computer Systems Interface (SCSI) 5¼-in. Winchester controller board for single-user applications. It is selling for $225.

The ACB-2000 controller board is priced at $288, and the ACB-2002 IBM Personal Computer XT-compatible 5¼-in. controller board sells for $255.

Adaptec also will display the ACB-5500 SCSI controller board for multifunction computer applications ($560) and the ACB-5580 SCSI storage module device controller board ($980).

Adaptec will also exhibit its chip products, including the AIC-100 Winchester controller chip ($65), the AIC-250 encode and decode chip ($16.25) and the AIC-300 dual-port buffer controller ($21.25). The spokesman said the chips are the foundation of Adaptec's controller boards and can be used as the core for custom controller boards.

Adaptec, 580 Cottonwood Drive, Milpitas, Calif. 95035.

LAPINE TECHNOLOGY, INC.
Booth H352

Lapine Technology, Inc. will introduce the Ranger, a half-height, 3½-in. Winchester disk drive.

The Ranger is offered in 5M-byte and 10M-byte formatted capacity for ST412/506 interfaces, compatible with the IBM Personal Computer and its compatibles, the company said.

The Ranger is said to be of rugged design to withstand travel conditions. It weighs 2 pounds and measures 1.625-by 4- by 5¾ in.

The price for the 10M-byte Ranger in low OEM quantities (Model 3522) is approximately $500, and the price for the 5M-byte Ranger (Model 3521) in the same quantities is approximately $450, the vendor said.

Evaluation units of the Ranger will be available in the last quarter of 1985, and full production shipments will begin in the first quarter of 1985, according to the company.

Lapine Technology, 1111 Space Park Drive, Santa Clara, Calif. 95054.

It's a simple fact that your small computer can compute a lot faster than your printer can print. A problem that becomes even more frustrating in business, when your computer is tied up with your printer while you're ready to move on to other work.

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The 3014/3024 models print 132 columns. The 3184, 3304 and 3404 models give you a full 136 column width, and offer color printing as well.

Each printer is easy to use, lightweight, functionally styled and attractive. And you can choose options from pedestals and paper racks to document inserters, sheet feeders and 8K character buffer expansion, plus more.

Genicom 3000 PC printers feature switch selectable hardware, dual connectors and dual parallel or serial interfaces. Plus the 3014 and 3024 emulate popular protocols for both Epson MX with GRAFTRAX-PLUS™ and Okidata Microline 84 Step 2™, while the 3184, 3304 and 3404 emulate popular protocols for Epson MX with GRAFTRAX-PLUS™. So your current system is most likely already capable of working with these Genicom printers without modification.

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POWER SYSTEMS at NCC

SOLA ELECTRIC, INC.
Booths A1604-A1606; A1700-A1702

Sola Electric, Inc. will display two uninterruptible power supplies (UPS) and a standby power source (SPS).

The 1.0 kVA model UPS uses two separate dc power supplies to power the inverter and charge the battery. This, the vendor said, reduces the input power factor to 0.96 minimum at rated load. The product is available in a 120V, 60Hz model and a 220/240V, 50Hz model. The 1.0 kVA is priced at $2,955, the vendor said.

Also on display is the 750VA Mini-UPS portable, plug-in unit, designed to protect small electronics from ac power-line problems. The Mini-UPS is said to regulate output voltage to within three units of nominal, despite input fluctuations from 10% to -15%, according to the vendor. The 750VA is priced at $1,619, the vendor said.

The SPS is an off-line backup power system said to provide protection against blackouts by switching from line power to battery/inverter power when line voltage drops below a set level. When the ac line voltage drops below -15% of nominal, the load is transferred to the inverter within four to 10 msec, according to the vendor.

The SPS 400VA unit is priced at $720, while the SPS 800VA unit is priced at $855, the vendor said.

Sola Electric, 1717 Busse Road, Elk Grove Village, Ill. 60007.

NOVA ELECTRIC MANUFACTURING CO.
Booths A1231-A1233

Nova Electric Manufacturing Co. will display a number of its power systems.

Integra was designed for applications in data processing, data and telephone communications, process control and security systems. It includes a battery charger, inverter and solid-state transfer switch in one cabinet. The batteries are housed in a separate matching cabinet. The price is $14,000.

Supernova is a sine-wave, uninterruptible power supply (UPS) operating in the forward transfer mode. With a loss of utility power, or when the ac line voltage drops too low, a transfer switch places the load on the inverter, which is powered by internal service-free batteries. When utility power is restored or the ac line is returned to proper levels, the load is automatically retransferred back to the ac line, the vendor said. The price is $645.

The 1 kVA Mintaur UPS has batteries and a one-quarter cycle transfer switch in a 7-in. high module. It is designed for operation of a variety of equipment, including microcomputers, communications equipment, word processors, point-of-sale terminals, process control equipment and computer-aided design and manufacturing systems. The price is $3,700,

Nova Electric Manufacturing, 263 Hillside Ave., Nutley, N.J. 07110.

RTE DELTEC CORP.
Booth C3142

RTE Deltec Corp. has announced a 2.5 kVA uninterruptible power supply available in a rack-mountable package or in a 40-in. cabinet. The unit offers up to 10 minutes of battery reserve power.

The 7000 Series is said to utilize bipolar transistors switching at 25 kHz to achieve pure-output sine wave. Output regulation is achieved by pulse width modulation.

The unit reportedly includes a built-in static transfer switch, available in either 120V, 220V or 240V versions at 50Hz or 60Hz.

It was designed for use with computer systems, memory devices and telecommunications systems.

Prices start at $6,295.

RTE Deltec, 2727 Kurtz St., San Diego, Calif. 92110

SHAPE MAGNETRONICS, INC.
Booth D3725

Shape Magnetronics, Inc. will display its series of Line Tamer power conditioners for computers, telecommunications and other computerized equipment applications.

Line Tamer units range in size from 30VA to 75 kVA single-phase and from 7.5 kVA to 75 kVA three-phase.

Prices range from $118 for the 30VA single-phase unit to $23,800 for the 75 kVA three-phase unit.

Shape Magnetronics, 901 DuPage Ave., Lombard, Ill. 60148.

DRANETZ TECHNOLOGIES, INC.
Booths A1404-1406

Dranetz Technologies, Inc. will announce an auto-answer modem that plugs into the rear panel of its Series 626 Remote Monitor Units to provide direct transmission of power-line disturbance data at 300 bit/sec transfer rate.

The DM-C15 Modem Cartridge enables the Series 626 to analyze power-line disturbances and report results over telephone lines. The price is $350.

Dranetz Technologies, 1000 New Durham Road, CN-91, Edison, N.J. 08818.

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OTHER THINGS TO SEE at NCC

VU-DATA CORP.
Booth A1130

Vu-Data Corp. has announced Model 4100, the first in a series of field-service oscilloscopes.

The Model 4100, weighing approximately 15 lb and occupying 561 cubic inches, reportedly fits into a field engineer's tool kit or under an airplane seat and can be carried up a radar or communications tower. Model 4100 features a floating CRT within a full mu-metal shield, cushioned with layers of sponge rubber pads, Vu-Data said. It costs $2,295.

Vu-Data , 7122 Convoy Court, San Diego, Calif. 92111.

FENWAL, INC.
Booth A1300

A demonstration of the fire-fighting power of Halon 1301, in which a man sets himself on fire in a telephone booth, will highlight Fenwal, Inc.'s exhibit. John C. Lowrey, director of advertising and public relations for Fenwal's Protection Systems Division, has been performing this demonstration at the National Computer Conference and other conventions for years.

Halon 1301 is a noncorrosive, nonconductive gas that reportedly will not damage sensitive electronic equipment such as that found in computer and DP facilities.

Because each fire-fighting system is custom-designed, based on various elements, pricing is individual for each application.

Fenwal, 400 Main St., Ashland, Mass.

AIRFLOW CO.
Booths D4204-D4208

The Datac Division of Airflow Co. will exhibit its Datac Chiller for water-cooled mainframes and its Skyhook ceiling-mounted, spot-cooling air conditioner.

The Datac Chiller mainframe cooling system is said to operate with mixtures of air, water, glycol and/or an external chilled water supply cooled system. The system is modularly designed, and each module is self-contained and independent of outside tie-lines, providing redundant systems with 100% backup.

An energy conservation cool option can reduce operating costs of the unit by as much as 50%, the spokesman said. The system will cost between $9,000 and $25,000.

The Skyhook ceiling-mounted, spot air-conditioning unit is said to satisfy spot-cooling needs for computer rooms, automated banking kiosks, telephone switching rooms and modular construction units. Features include lightweight construction, shallow 17-in. drop from ceiling, two water condensate overflow devices and choice of air-cooled or water/glycol-cooled systems.

Airflow, Montgomery County Airpark, 19050 Laytonsville Road, Gaithersburg, Md. 20879.

HEADQUARTERS COMPANIES
Booth D4316

Headquarters Companies will be displaying photographs of its office business centers, listings of its services and cost comparisons with conventional offices at the National Computer Conference.

Headquarters operates 60 business centers nationwide, which are offices equipped by Headquarters, fully automated and leased by client firms. A spokesman for the company said 60% of its clients are Fortune 1,000 firms, 30% are small busineses and 10% are entrepreneurs.

Clients reportedly include IBM, Xerox Corp. and Motorola, Inc. According to the spokesman, the cost of leasing a Headquarters office is said to yield up to a 50% savings over traditional office and staff costs.

Headquarters, Three Embarcadero Center, Eighth Floor, San Francisco, Calif. 94111. .

VOICE CONTROL SYSTEMS, INC.
Booth H432

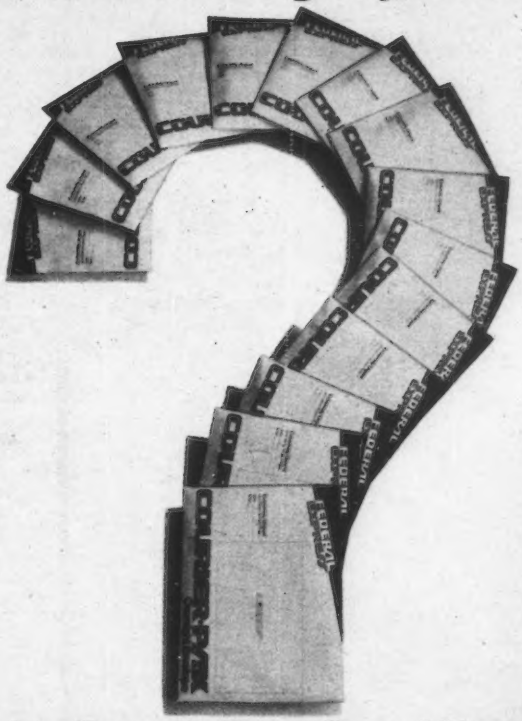
Voice Control Systems, Inc. has announced it will demonstrate its speaker-independent, voice recognition software systems, which can be custom-designed for a variety of computers and microprocessor products.

According to a spokesman, the systems have been developed to recognize human speech accurately with no prior training on the system or speaker restrictions required. The systems are said to have applications in telecommunications and as human interfaces to computer systems.

Among the software technologies to be demonstrated will be the US1 system, which recognizes the words "yes" and "no"; the US2 system, which recognizes directional instructions such as backward, forward, up and down; and the US10 system,

Continued on Preview/46

Why Pay For Their 2 Pound Envelope When You're Sending Only 1 Pound



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Continued from Preview/45
which recognizes spoken digits zero through nine.

The spokesman said the software is licensed at approximately $2,500 per recognized word.

Voice Control Systems, 16610 Dallas Pkwy., Dallas, Texas 75248.

ELECTROHOME LTD.
Booth B3124

Electrohome Ltd. has announced that it will exhibit its Electrohome Video Monitor (EVM) line of monochrome video monitors.

According to a spokesman, the five basic EVM video monitors are available in 9-, 12-, 15-, 17- and 23-in. screen sizes. They offer front-operated switching, 18-MHz bandwidth and Scanguard, a circuit feature designed to keep picture sizes constant over a wide range of brightness changes.

In addition, primary and secondary controls are said to be front-accessible, and the units provide internal and external synchronous capability.

The EVM monitors also feature black-level stability, common-mode rejection and universal ac interlock. The unit's power supply is switchable for 110, 220 or 240V operation, and ceiling mounts are available for the larger screen sizes, according to a spokesman for the vendor.

Products in the EVM line include the EVM 920, priced at $525, the EVM 1220 for $595, the EVM 1519 for $650, the EVM 1719 for $675 and the EVM 2319 for $880.

Electrohome, Public Relations Department, 809 Wellington St. N., Kitchener, Ont., Canada N2D 4J6.

FIBERBILT
Booth C3482

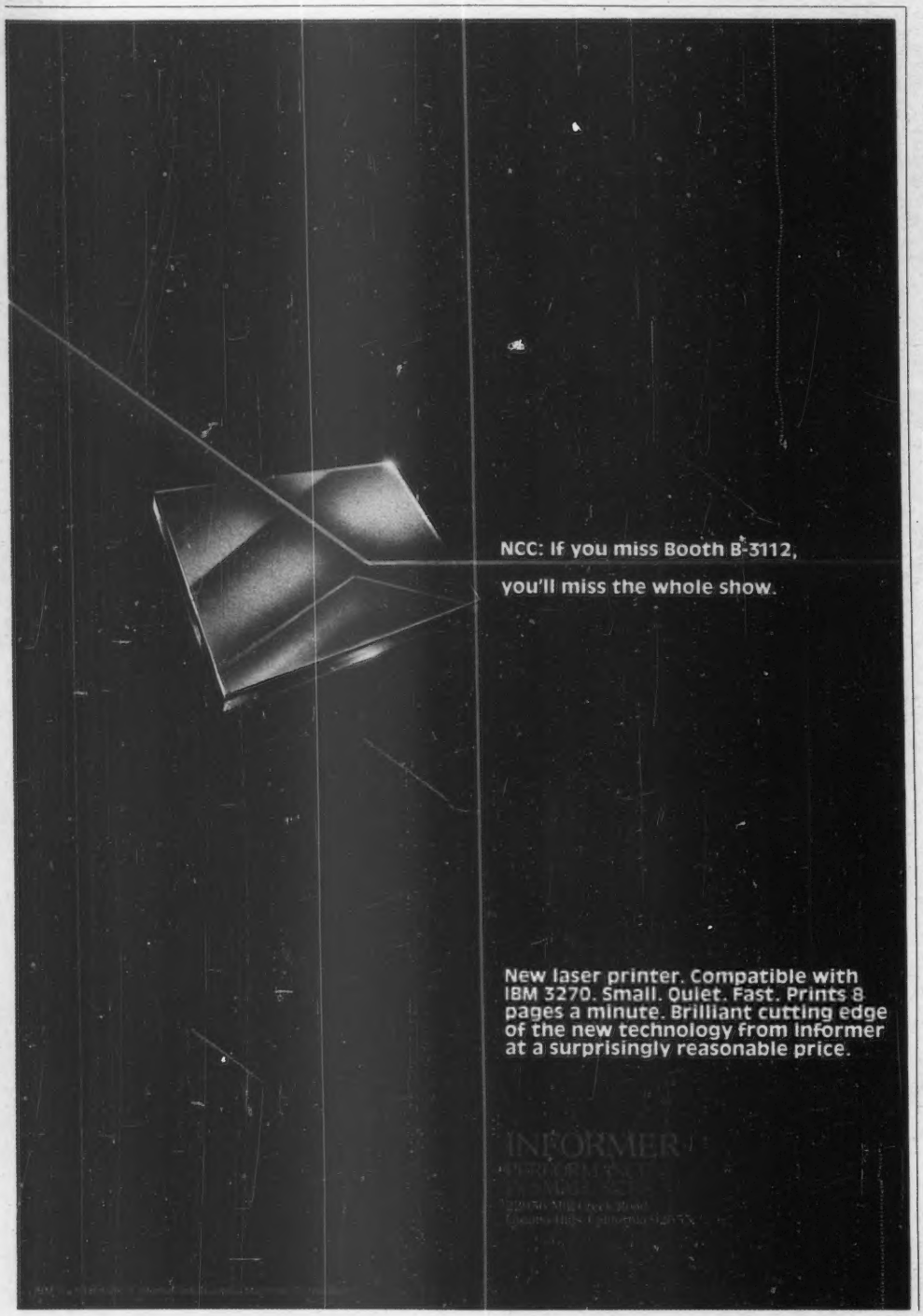
Fiberbilt has announced it will exhibit its 808 Supercase, which can be used for shipping computers and components.

According to a spokesman, the 808 Supercase is molded of high-density polyplex and is finished with heavy-duty hardware. It features a ½-in.-thick alloy tongue-and-groove valance, an internal rubber gasket for moisture protection, two fully recessed steel turn latches, a tumbler lock, a continuous hinge and trunk bumpers.

The case is available in 11 stock sizes and may be ordered empty or filled with foam, the vendor said.

Prices for the 808 Supercase without foam range from $135 to $250 and with foam from $173 to $337.

Fiberbilt, 601 W. 26th St., New York, N.Y. 10001.



ADVANCED OFFICE CONCEPTS CORP.
Booth H441

Advanced Office Concepts Corp. (AOC) has announced it will exhibit its "Market Guide on Word Processing Systems," which is said to be the third in a series of AOC handbooks on office automation systems.

According to a spokesman, the publication gives a user or manufacturer a complete analysis of every word processing system on the market. It is updated each month with information on new hardware and software, product enhancements, distribution channels, component pricing and other developments in the marketplace.

The word processing publication joins AOC's "Market Guide to Office Automation Systems and Personal & Professional Computers." Each is available at the annual subscription rate of $135 within the U.S. and Canada and $165 elsewhere.

AOC, One Bala Plaza, Bala Cynwyd, Pa. 19004.

DATAPRO RESEARCH CORP.
Booth A1644

Datapro Research Corp. has announced EDP Cluster, a series of reports designed as decision support tools for MIS managers.

The series includes Datapro 70 at a cost of $875, Datapro Reports on Minicomputers for $745, Datapro Directory of Software for $495, Datapro EDP Solutions for $455 and Datapro Applications Software Solutions for $465, according to the vendor spokesman.

Datapro Research , 1221 Ave. of the Americas, New York, N.Y. 10020.

WESTERN GRAPHTEC, INC.
Booths C3463-3465

Western Graphtec, Inc. has announced a B/A3-size, 10-pen plotter designed for use in computer-aided design, engineering and busi-

ness graphics applications.

The FP 5301 will replace the WX 4630 series of lower speed one-, two- and 10-pen plotters, according to the company.

The FP 5301 is said to feature a speed of 17.7 in./sec axially and 25 in./sec diagonally. It reportedly is available with a self-capping pen, ballpoint pens, fiber-tip pens, ink drafting pens and pencil. A built-in pen sensor is said to detect the type of pen automatically and optimize the plotting speed and pressure.

It was designed to interface with all types of computers through any of three standard interfaces — RS-232C, GPIB/IEEE-488 or 8-bit parallel.

According to the vendor, it features 47 programmable function commands.

Targeted at the OEM and end-user markets, the FP 5301 costs $3,000.

Western Graphtec, 12 Chrysler St., Irvine, Calif. 92714.

TEXWIPE CO.
Booths C3360; C3362

Texwipe Co. will display at the National Computer Conference its Dual-Purpose Floppy Disk Head Cleaning Kits and its Microcomputer/Word Processing Datakits, among other products.

The head-cleaning kits, offered in 5¼- and 8-in. versions, each contain two cleaning disks, reportedly capable of cleaning both single- and dual-sided diskettes. The kits provide up to 15 separate cleanings each.

The Microcomputer/Word Processing Datakits, packaged in reusable vinyl cases, include a cleaning diskette, aerosol solvent and products for cleaning and static control of the CRT terminal screen, keyboard and exterior machine housing.

The Dual-Purpose Floppy Disk Head Cleaning Kits are priced at $24 for either diskette size. The Microcomputer/Word Processor Datakits are priced at $42 for the 5¼-in. diskette version and $43 for the 8-in. diskette version.

Texwipe, P.O. Box 308, Upper Saddle River, N.J. 07458.

IDENTATRONICS, INC.
Booth D4325

Identatronics, Inc. will display a photo identification device that reportedly can communicate with a variety of IBM, Honeywell, Inc. and NCR Corp. hardware.

The Super All-In-One identification device produces bar code or magnetic strip photo identification cards that are reportedly compatible with access control, computer and time/attendance equipment. The identification cards can be used for inventory control, time/attendance, job costing and other applications, the vendor said. The unit is self-contained and weighs approximately 20 pounds.

It costs $1,450.

Identatronics, 425 Lively Blvd., Elk Grove, Ill. 60007.

KANGAROO VIDEO PRODUCTS, INC.
Booth D3632

Kangaroo Video Products, Inc. will exhibit its Chip-Tote PCD-1, foam-filled portable computer case at the National Computer Conference.

The Chip-Tote reportedly fits the Radio Shack TRS-80 Model 100, Epson America, Inc. HX-20 or NEC Information Systems, Inc. PC-8201 portable computers and serves as a desk so that the computer need not leave the bag. The case's stand-up cover holds papers upright, and inner pockets are provided for notebooks.

The Chip-Tote is available in either black or smoke gray for $59.95.

Kangaroo Video Products, 9190 Manor Drive, La Mesa, Calif. 92041.

NORTHWEST MOLDED PRODUCTS
Booth B4028

Northwest Molded Products will display samples of the product enclosures that it custom-molds for electronics equipment manufacturers.

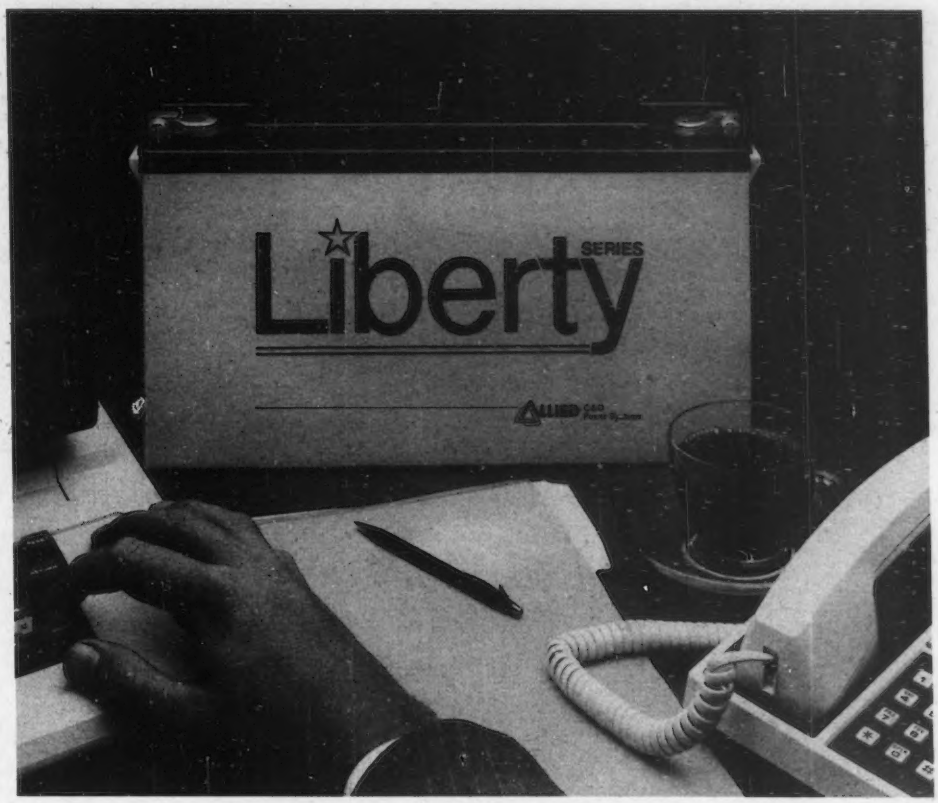
The firm reportedly has complete production capabilities and in-house coordination of all phases of production, from designing the tool and building the mold to providing secondary operations.

Secondary operations include finishing and assembly of additional components, according to the vendor.

The firm's service is offered at prices ranging from $5 to $100 per molded unit, the vendor said.

Northwest Molded Products, P.O. Box 99057, Tacoma, Wash. 98499.

Continued on Preview/48



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ALLIED C&D Power Systems

Continued from Preview/47

COMPUTER SCIENCE PRESS, INC.
Booth A1600

Computer Science Press, Inc. will be displaying computer-related books focusing on programming in Pascal and other languages and on circuit design and algorithmic theory.

Paradigms and Programming With Pascal by Derick Wood reportedly provides a fundamental programming methodology and uses exemplars and patterns for problem solving. It costs $25.95.

Fuzzy Sets, Natural Language Computations and Risk Analysis by Kurt J. Schmucker is said to show how computers can use natural-language input to evaluate imprecise data such as the risks to which a computer system may be subject. It costs $32.95.

Fundamentals of Data Structures in Pascal by Ellis Horowitz and Sartaj Sahni updates the 1976 publication, *Fundamentals of Data Structures*, by translating its algorithms into Pascal, according to the publisher. It costs $26.95.

Pascal for Fortran Programmers by Ronald H. Perrott and Donald C.S. Allison is meant to help Fortran users who want to learn Pascal and those who want to apply new theories of programming to Fortran. It is priced at $18.95.

Computational Aspects of VLSI by Jeffrey D. Ullman is said to address several applications of computer science principles to very large-scale integration, including development of algorithms for silicon computers and other design tools. It is priced at $32.95.

Apple Assembly Language by Douglas Maurer is intended as a text for Apple Computer, Inc. Apple II hobbyists and home users. It reportedly includes more than 300 exercises, assuming knowledge of a programming language such as Basic, Fortran or Pascal, but requiring no knowledge of hardware. It costs $17.95.

Micos, A Microprogrammable Computer Simulator by Lubomir Bic is said to be a book and diskette-based package designed to teach the basic principles of assembly language and microprogramming. The book costs $15.95 and the diskette $15.

Computer Science Press, 11 Taft Court, Rockville, Md. 20850.

ROYAL SEATING CORP.
Booth D4321

Royal Seating Corp. has announced furniture designed to accommodate printers and the IBM Personal Computer and PCjr.

The 5712-H series is designed to hold various models of printers. Its top is 24-inches wide and 20 inches deep with a 15¾-in. slot. It has a ¾-in. walnut woodgrain, safety-banded plastic top and 27-in.-high black textured frame. It is priced at $58.90, according to the vendor.

The 5800 series furniture is designed for the IBM Personal Computer and PCjr. The 5812-D has a 24- by 26-in. top and a 27-in.-high frame, while the 5812-S has a 20- by 24-in. top, 2¼- by 15¾-in. slot and 27-in.-high frame. The 5812-P has a 20- by 24-in. top with a 10- by 15¾-in. cutout and 27-in.-high frame, a spokesman said.

Prices for the furniture grouping start at $253.20, according to the spokesman.

Royal Seating , P.O. Box 753, Cameron, Texas 76520.

OCLI-OPTICAL COATING LABORATORIES, INC.
Booths 1047, 1145-1147

Ocli-Optical Coating Laboratories, Inc. will introduce its Glare/Guard antiglare glass panels designed for use with more than 600 currently available VDTs.

According to a spokesman, the Glare/Guard panel utilizes Ocli-Optical Coating Laboratories' High Efficiency Antireflection (HEA), thin-film coating. The panels are said to reduce CRT glare by 94% to minimize reflected brightness and enhance image-to-background contrast while maintaining resolution for improved readability.

Glare/Guard's $99 price includes the HEA-coated panel in a high-impact plastic frame, hook-and-loop strips for mounting and removal, a bottle of cleaning solution and a cleaning cloth, according to the vendor.

Ocli-Optical Coating Laboratories, Department 109/DG, 2789 Northpoint Pkwy., Santa Rosa, Calif. 95407.

CAREER RESEARCH SYSTEMS, INC.
Booth C3488

Career Research Systems, Inc. will display two of its publications at the National Computer Conference — the "Career Opportunity Index" and the "Career Opportunity Update."

The "Career Opportunity Index" reportedly provides profiles of the firm's 400 client companies and their products and services. It is said to offer a brief history of the size, locations and employment opportunities and requirements of each. It is published twice annually in three regional editions.

The "Career Opportunity Update" reportedly provides a description of the actual job openings available with the firm's client companies. It also is said to be used by professional societies and alumni associations. It is published monthly.

The "Career Opportunity Update" is priced at $7.50 per copy. The "Career Opportunity Index" is priced at $10 per copy.

Career Research Systems, 17371 Mount Wynne Circle, Fountain Valley, Calif. 92708.

COMPUTER-LINK CORP.
Booths A1232-A1234

Computer-Link Corp. has announced Model 3600 and Model 3800 tape cleaners and evaluators.

The models use a Zilog, Inc. Z80 microprocessor and permit preprogrammed error limits, tape lengths, leader lengths and stripping relocation with one-button maintenance, Computer-Link said. Model 3600 reportedly tests seven- and nine-track tapes with densities of 800 or 1,600 bit/in. Model 3800 works with nine-track tape with densities of 800, 1,600 or 6,250 bit/in. The product will reportedly analyze error acceptance levels and automatically relocate to strip a 100-ft section of tape.

Model 3600 costs $1,650; Model 3800 sells for $18,000.

Computer-Link , 40 Ray Ave., Burlington, Mass. 01803.

MANAGEMENT CONTENTS
Booth H247

Management Contents will display its "Computer Database Thesaurus & Dictionary," an on-line user's guide to searching the company's Computer Database.

The "Computer Database Thesaurus & Dictionary" reportedly explains the scope and coverage of the Database, journal selection procedures and editorial policies. The Database's 398 fields are described, and each of the search terms is defined.

The Database itself reportedly covers the body of information about the computer industry, its advances and changing technology. The guide was designed to answer the questions of business and computer professionals about hardware, software, peripherals and services.

The "Computer Database Thesaurus & Dictionary" is priced at $120 per copy. The Computer Database costs $85 per hour for connect time.

Management Contents, Suite 5000, 2265 Carlson Drive, Northbrook, Ill. 60062.

MULTIMATIC, INC.
Booth C3650

Multimatic, Inc. has announced Multifeed 430, a single-sheet feeder that works with daisywheel and dot matrix printers.

The product features a snap-on feeder plus a customized bracket for each printer. This feature reportedly allows the user to buy one snap-on feeder and a number of custom brackets for different models.

The snap-on feeder costs $395, while each custom bracket sells for $50.

Multimatic, 2030 Upland Way, Philadelphia, Pa. 19131.

SEITZ TEK, INC.
Booth B4038

Seitz Tek, Inc. has announced three printer paper holding devices: the ST-125 mechanical sheet feeder, ST-611 mechanical forms tractor and ST-150 multipaper feeder.

ST-125 provides automated feeding of up to 125 sheets of paper, Seitz said. ST-611 reportedly features bidirectional feeding and an antibacklash drive. ST-150 combines a sheet feeder and bidirectional tractor in one unit.

ST-125 costs $495; ST-611 sells for $125; ST-150 is priced at $595.

Seitz Tek, P.O. Box 1398, Torrington Industrial Park, Torrington, Conn. 06790.

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DATA GENERAL SOFTWARE POLICY

The Data General software license for use of Data General software on a specific, serialized Data General computer is issued solely to the user (licensee) of the computer system. Should the computer be sold, or transferred to another party, this personal license is not transferable. The new user may use Data General software only by obtaining a new software license directly from Data General and paying Data General the appropriate license fees/charges.

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SYSTEMS & PERIPHERALS

HARD TALK
Tom Henkel
CW Senior Editor

IBM network plans fuel rumor mill

Each year, companies spend millions on hardware and software designed to speed up the process of shuttling information from one place to another. It is truly amazing that in spite of all this sophistication, nothing seems to travel faster than a juicy rumor.

A few weeks ago, one such rumor managed to blanket the IBM-watching community in a matter of hours. It goes like this:

IBM is poised to announce, possibly at the National Computer Conference next week, a high-end control unit for its 3270 line of terminal products. The interesting theory that surrounds this rumor is that this control unit will contain microcoded networking capabilities that will allow it to offer features similar to a local-area network.

If this proves to be true, IBM will have pulled off another marketing coup.

It is no secret that IBM is planning to introduce some sort of local-area networking product. The big question does not appear to be *will* IBM announce the product, but *when* will IBM decide the time is right to tip its hand.

Details of an IBM local-area network have been floating about Europe for better than a year now. Domestically, IBM recently unveiled what many feel is a vital piece of a local-area networking strategy in its Cabling System, basically an IBM-approved blueprint for wiring an office building for data communications.

With rumors of a local-area network running so hot, it is clear dozens of entrepreneurs and established companies are eagerly waiting for IBM to make the formal announcement so they can unveil IBM local-area-network-compatible products.

If IBM was to take the traditional approach to building a local-area network — that is create a network out of a series of hardware and software products — a flood of compatible products would undoubtedly wash onto the market in a matter of weeks. But if IBM was to hide big portions of its local-area network in microcode, it could keep the competition at bay for months. And even when the competition figures out how this mythical 3270-type control unit works, IBM would still have the power to change the networking rules with the swap of a circuit board.

It is wise to take the speculations of the rumor mill with a grain of salt. Often rumors are on target; but just as often, they can be way off base. For example, IBM announced two versions of its 3270 Personal Computer, days after the control unit rumors flooded the IBM-watching community. Were the rumors wrong? Or just a preview of things to come? The concept of a 3270-type control unit, with microcoded networking capabilities, seems to make sense, hence its mention here.

IBM is, and always has been, in the hardware business. It is not a provid-

See **RUMOR** page 63

Kodak extends offerings

Firm enhances document index, retrieval systems

By David Myers
CW New York Bureau

ROCHESTER, N.Y. — The Eastman Kodak Co. has beefed up its line of document index and retrieval systems with the introduction of two minicomputer-driven, packaged information systems, along with an intelligent microfilmer and a microimage terminal.

Kodak spokesmen said the Reliant 2000 microfilmer, which they described as capable of filming 700 document/min on coded 16mm film, and the newly announced terminal could be purchased separately or as components of the minicomputer setups.

The information systems, called the KAR-4400 and KAR-2200, consist of a CPU, printer, disk storage, CRT terminals, the newly announced IMT-250 microimage terminals and operating system and applications software.

The larger KAR-4400 system, said by Kodak spokesmen to be aimed at mid- to high-volume job streams of 3,000 to 7,000 documents per day, can drive up to 16 terminals and includes up to 300M bytes of disk storage. Pricing on the system begins at $76,000 with availability slated for August.

The smaller KAR-2200 system, designed to handle between 500 and 3,000 daily documents, can drive up to eight terminals and hold up to 54M bytes of disk storage. Kodak said the system will be available this fall and will cost roughly $10,000 to $20,000 less than the KAR-4400.

Kodak said the minicomputer systems were built around a 64K-byte Applied Digital Data Systems, Inc. (Adds) Model 4000EP processor with either 512K or 1M byte of random-access memory.

The larger KAR-4400 system incorporates 14-in. Winchester disk drives in six models ranging in storage capacity from

See **KODAK** page 63

VG Systems announces supermini

WOODLAND HILLS, Calif. — VG Systems, Inc. has announced the VG 9000, a 32-bit, IBM-compatible superminicomputer and two-color graphics raster workstations. The products were designed for stand-alone or distributed computer-aided design and manufacturing (CAD/CAM) applications.

The system, which costs $120,000, consists of the two display stations, a Canaan Computer Corp. Series 5000 IBM VM/CMS-compatible processor, 2M bytes of random-access memory, two Priam Corp. 85M-byte disk drives, a Cipher Data Products, Inc. IBM-compatible nine-track tape drive, a Racal-Redac, Inc. modem, a control terminal and a printer.

The display stations of the System 9000 are VG Systems' VG 9250 high-resolution color raster displays. Each station is equipped with its own display and communications processor, keyboard, function keyboard, data tablet and light pen. With VG Systems' proprietary new tracking method, an operator is said to be able to track any color at any visible intensity with uninterrupted operation across the full screen, the vendor claimed.

The 9000's CPU, memory, disk drives, tape unit and power supplies are housed in a 10 cubic-ft package that requires no special power or environmental conditioning, according to the vendor. It runs standard IBM compilers and utilities and a range of application software developed for IBM, including Cadam, developed by Lockheed Aircraft Co. and now owned by Cadam, Inc.

Both the VG Systems' VG 9250 and VG

See **VG** page 63

Delphax Systems offers nonimpact page printer

Delphax Systems, Inc. has announced the Series 6000 (S6000) nonimpact page printer, said to print 60 page/min.

The typical S6000 is intended to be sold by OEMs for $60,000 to $70,000, the vendor said. Shipments are expected to begin in September.

The S6000 is intended for large-volume printing tasks requiring 100,000 to 1.5 million copies or more each month. The product is targeted at DP shops with IBM 3211 or 3203 printers, the vendor said.

With a resolution of 240 by 240 pixel/in., the S6000 is said to be capable of printing both forms and variable data simultaneously. The products integrate Delphax's existing 2460 engine with a Digital Equipment Corp. LSI-11 processor and specially designed image-generation electronics. Delphax said it also supplies IBM 3211 and Dataproducts Corp. interfaces.

The S6000 can be configured to support additional image-generator cards, such as graphics and variable-forms cards, using the product's four available slots, the vendor said. The S6000 could also be expanded by an OEM to include a disk drive, additional buffers and a control unit that would allow users to key in job requests at the printer site, the vendor said.

See **S6000** page 63

Intel 256K-byte chips based on CHMOS tech

SANTA CLARA, Calif. — Intel Corp. has unveiled three 256K-byte memory chips based on the firm's CHMOS technology. The firm said the memory chips are the highest density units it has ever produced with the CHMOS technology.

The firm said the devices use 80 times less power than a 64K-byte Nmos device. The 51C256H random-access memory (RAM) is said to be optimized for high-performance applications, such as graphics displays. It has a 120-nsec access time and a Ripplemode feature that allows it to operate with a 65-nsec cycle time.

The 51C256L was designed for applications requiring low power consumption, such as portable computers and instruments. It requires a total data retention current of 230 uA, 1/20th the requirement of an Nmos 256K-byte product, the vendor claimed.

The 51C256HL provides a combination of the lower power requirements of the 51C256L with the performance features of the 51C256H, the vendor said.

The units are pin-for-pin compatible with Intel's 2164A, 64K-byte RAM and will be available in August. The units cost from $115.45 to $179.50 each, in quantities of 100.

Intel is located at 3065 Bowers Ave., Santa Clara, Calif. 95051.

INSIDE

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Auxiliary Equipment/59

SYSTEMS & PERIPHERALS

DATA STORAGE

ALPHANUCLEAR
Model 610

Alphanuclear has announced a nonvolatile mass data storage system designed for use with remote automatic data acquisition systems.

The Model 610 is said to use RS-232 communications to input data to its bubble memory system. It reportedly shifts into a low-power state during periods of inactivity to conserve power.

It has a capacity of 128K bytes of Ascii characters and includes two modules so that when one unit is full it can read out while providing an uninterrupted data recording capability.

Scheduled for deliveries late in the third quarter, it costs $2,500.

Alphanuclear, 6380B Viscount Road, Mississauga, Ontario, Canada L4V1H3.

TERMINALS

HEWLETT-PACKARD CO.
HP 2392A

Hewlett-Packard Co. has announced the HP 2392A display terminal, priced at $1,295 or 40% below the HP 2622A block-mode data-entry terminal it supersedes, the vendor said.

The lower price was made possible by incorporating very large-scale integration circuit technology and a reduced component count, the vendor said.

Characters on the HP 2392A, which occupies approximately one cubic foot of desk space, are formed with a 9- by 14-pixel green display screen.

The HP 2392A terminal is intended for data entry, program development and data-inquiry applications on the HP 3000 business computer, HP 1000 real-time computer and HP 9000 engineering workstation, the vendor said.

Communication with HP and non-HP host systems is possible with a combined RS-232/HP 422 port, the vendor said. An optional port allows the terminal to be connected directly to a printer.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

PRINTERS/PLOTTERS/PERIPHERALS

CENTRONICS DATA COMPUTER CORP.
Printstation 240; 250 series

Centronics Data Computer Corp. has announced the Printstation 240 series and 250 series, said to be high-resolution printers designed for the personal computer/small business markets.

The 240 series is a 24-pin dot matrix printer capable of printing 10 pica and 12 elite char./in. Proportional fonts can be selected from the front panel. A single-bin sheet feeder in 80- and 132-col. versions can be installed. Print speed is 80 char./in. in letter-quality printing and 160 char./in. in a draft mode.

Available this fall, the 240 series printer costs $1,495, the vendor said.

The 250 series is an 80-col. dot matrix printer intended to complement workstation applications, personal computers, small business systems and mainframe and terminal systems.

Standard features on the 250 series include four- or seven-color printing for graphs and charts, LED control panel, very large-scale integration for enhanced control capabilities and improved reliability and self-feeding document insertion. The 250 series prints at 185 char./sec proportional printing, 160 char./sec draft printing and 40 char./sec near letter quality at 10 char./in., the vendor said.

The price for the 250 series printer, expected to be available in the fall, is $1,299, the vendor said.

Centronics Data Computer, 1 Wall St., Hudson, N.H. 03051.

CENTRONICS DATA COMPUTER CORP.
Printstation Model 354

Centronics Data Computer Corp. has announced the Printstation Model 354, a 220 char./sec multifunction workstation printer designed for word processing applications.

The Model 354 is said to provide three-way forms handling of fanfold, demand document and single-cut sheets. In addition, the model allows attachment of the Centronics three-bin automatic sheet and envelope feeder. The Model 354 provides features including: correspondence print quality at 50 char./sec proportional printing, right justification, automatic centering, emphasis print, bold print, shadow print and font flexibility (optional 64K-byte CPU-loadable character sets).

The 354 may be adapted with an interface providing Diable Systems, Inc. 630 compatibility. Pin-addressable graphics is standard in densities of 72- by 72-pixel resolution or 144 dot/in. An optional LCD is offered to facilitate feature selection and power up diagnostics.

The list price of the 354 is $2,195, the vendor said.

Centronics Data Computer, 1 Wall St., Hudson, N.H. 03051.

VERSATEC, INC.
Model 7236; 7244

Versatec, Inc. has introduced two 200-point/in. electrostatic plotters designed to offer improved performance at 9% less cost than Versatec's previous 8000 series.

The Model 7236 plots on 36-in. wide paper or film and the 7244 on 44-in. wide media.

They are said to feature a plot speed control that permits an operator or host computer to set the speed from .125 in./sec to 1½ in./sec, enabling a plotting speed of 27½ sq ft/min. According to the vendor, the maximum accumulated error is ±.15% horizontal and vertical, a 25%

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Electrohome's EDP-57 is the proven and accepted way to project monochrome terminals for group presentations, training sessions and sales meetings.

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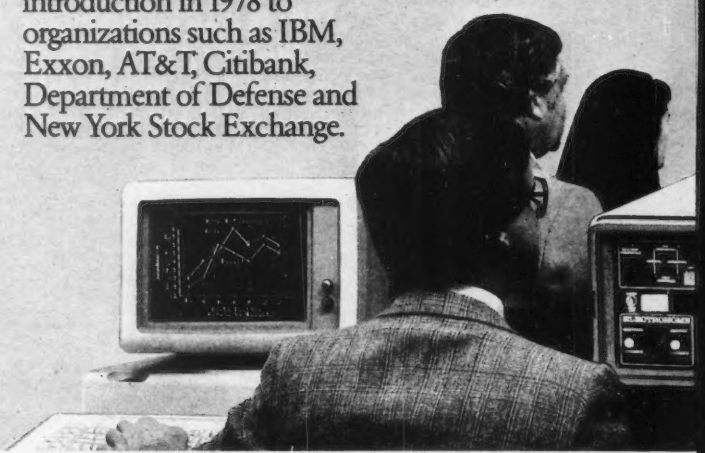
Thousands of Electrohome EDP projectors have been sold since its introduction in 1978 to organizations such as IBM, Exxon, AT&T, Citibank, Department of Defense and New York Stock Exchange.



SYSTEMS & PERIPHERALS

improvement over previous models.

They are designed to use standard voltages and demand 600W rather than the previous 1,600W.

They reportedly feature rear-loading, twin-roll media supply spools, diagnostic key pad/display, darkness control/display, line enhancement, mirror, reverse imaging and a mean time between failures of 4,000 hours.

Scheduled for delivery in August, the 7236 costs $38,900 and the 7244 $49,900.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

PHOENIX ELECTRONIC DEVELOPMENT CORP.
Smarty

Phoenix Electronic Development Corp. has announced Smarty, a microprocessor-controlled intelligent printer buffer, said to control simultaneously two Centronics Data Computer Corp. printers while allowing a system to process a third job.

Smarty is said to allow a job to abort instantly, check the status of available memory, verify the status of a job at any time and use Smart-Merge to allow address lists and form letters to be merged in the buffer.

Buffer space for each printer is variable. A two-way communication protocol with the buffer via an Ascii command structure ensures communications between the operator and the system, according to the vendor.

Smarty comes standard with 64K bytes of random-access memory (RAM), and 256K bytes of RAM is optional. Smarty is available both as a board for integration or as a stand-alone model.

Smarty as a stand-alone is priced at $349, and as a board for integration, its price is $325, according to the vendor.

Phoenix Electronic Development, 618 Venice Blvd., Marina del Rey, Calif. 90291.

POWER SUPPLIES

ISOREG CORP.
Isoguard UPS

Isoreg Corp. has announced its single-phase Isoguard uninterruptible power supply (UPS) system.

The unit is a static, continuous on-line UPS system that stores electrical energy in batteries until needed.

The Isoguard is said to provide power to within plus or minus 2% of correct voltage, when power line voltage deviates from normal by plus or minus 10%.

The internal battery pack provides full output power for 10 minutes, and more battery storage is available, the vendor said. Other options include the firm's RS-232 Computer Interface Terminal, Remote Alarm Interface and Remote Generator Starting Relay.

Isoguard units are rated from 300VA to 10 kVA single-phase and are available in 50Hz and 60Hz versions. In addition, the product is available with a variety of plug/socket designs for worldwide use.

Prices for the 60Hz models with 10-minute full-load battery packs are: 300VA, $1,566; 500VA, $1,914; 1 kVA, $2,894; 2 kVA, $4,582; 3 kVA, $6,728; 5 kVA, $11,426 and 10 kVA, $19,800.

Isoreg, 410 Great Road, Littleton, Mass. 01460.

BOARD-LEVEL DEVICES

DY-4 SYSTEMS, INC.
DSTD-776

DY-4 Systems, Inc. has announced the DSTD-776, a color CRT controller card for the STD-bus that can be configured for eight-level color or 16-level monochrome output.

Features include horizontal and vertical synchronization and video refresh data for a standard video monitor, according to the vendor. Character attributes include blink, intensity, foreground and background colors. An erasable, programmable, read-only memory character generator provides 256K-byte alphanumeric and character graphics with true lowercase descenders, the vendor said.

The DSTD-776 supports Zilog, Inc. Z80, Intel Corp. 8088 and Motorola, Inc. 68008 microprocessor addressing modes and thus is compatible with all DY-4 Systems CPU cards using those processors, according to the vendor. The card is intended for use with the DSTD-777 graphics controller to provide an overlaid character and graphics display. The DSTD-776 functions as the master, providing synchronization signals for the DSTD-777.

The DSTD-776 is priced at $417, the vendor said.

DY-4 Systems, 888 Lady Ellen Place, Ottawa, Ontario, Canada K1Z 5M1.

KLOCKNER-MOELLER CORP.
Sucos PS-31 Programmable Controller

The Klockner-Moeller Corp. has announced the Sucos PS-31 Programmable Controller for use by electricians and electrical engineers on smaller-size control applications.

The PS-31 uses a language that emulates ladder diagrams while using standard wiring diagram symbols and characters. The controller is self-contained and includes built-in timers, counters, shift registers and flip-flops.

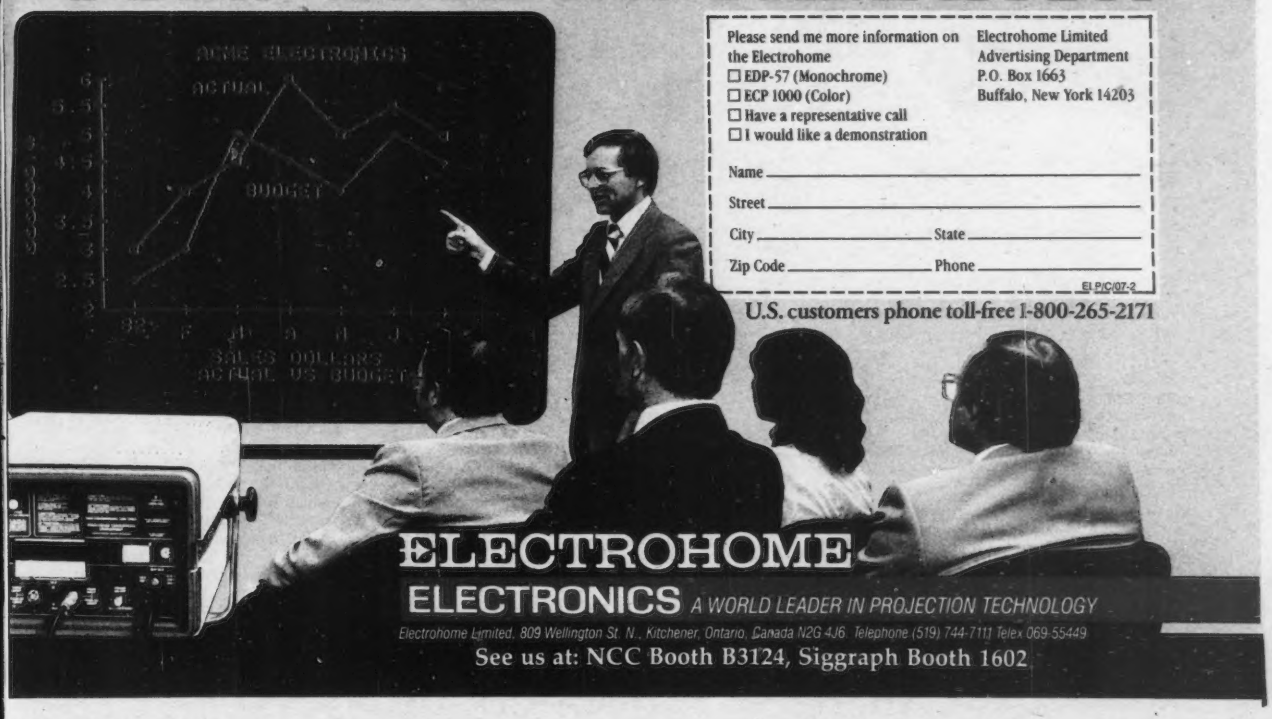
Other features include dry contact outputs and serial outputs. Voltage levels for inputs and outputs can be either +24V dc or 110/240V ac, the vendor said.

The PS-31 can be programmed by using either of two available programmers. The PRG-31 programmer has an LCD display which shows two current paths, each composed of seven contracts and one coil. The PRG-31 supports English, German, Italian and French, the vendor said. The PRG-311 is a light-pen programmer available for personal computers, the vendor said.

In single quantities, the PS-31

Continued on page 60

COMPUTER INFORMATION



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Continued from page 59

costs $550, the PRG-31 costs approximately $650, and the PRG-311 costs $1,000, the vendor said.

Klockner-Moeller, 4 Strathmore Road, Natick, Mass. 01760.

TELEPROCESSING PRODUCTS, INC.
Level One Test

Teleprocessing Products, Inc. has introduced a product said to provide the ability to conduct remote diagnostics on polled-multidrop or point-to-point Dataphone Digital Service (DDS) links from a network central site.

The product, called Level One Test, gives users the capability to conduct a diagnosis through a dumb Ascii terminal.

Level One Test reportedly uses a designated command structure to perform diagnostics on as many as 1,024 different remote locations on up to 16 DDS links without having to move or patch cables. The product consists of a test controller at the network's central site and a factory-installed Level One Test option board at each remote site.

The product reportedly provides DDS loopback, pattern generation and the ability to insert and check errors to verify controller operation. The ability to verify the status of the network is provided, along with other features, according to a company spokesman.

Level One Test is priced at $2,350 for the controller and $150 for each Level One Test option board.

Teleprocessing Products, Building 7K, 4565 E. Industrial St., Simi Valley, Calif. 93063.

VISUAL SYSTEMS CORP.
Viscopoint

Visual Systems Corp. has announced Viscopoint computer-assisted retrieval, said to be a user-friendly approach to computer-assisted microfilm retrieval based on Datapoint Corp.'s Associated Index Method and Visual Systems' Visacar programs.

The Viscopoint system can be used in the stand-alone configuration, or it can be linked with other Viscopoint processors using Datapoint's Attached Resource Computer local-area network, the vendor said.

The Viscopoint also provides data communications, both synchronous and asynchronous, with most mainframes using a variety of protocols, the vendor said.

The price for the Viscopoint ranges from $30,000 to $50,000, the vendor said.

Visual Systems, Suite 3204, 3000 Town Center, Southfield, Mich. 48075.

INTERMEC CORP.
Model 9320; Model 9161A

Intermec Corp. has announced the Model 9320 bar code reader and the Model 9161A port concentrator interface, said to be for low-cost, compact applications.

The 9320 is said to offer reading of nine major bar codes and can discriminate automatically among several bar code combinations for applications requiring mixed symbologies, according to the vendor. The 9320 operating as a stand-alone reader can be connected directly to a host computer port, the vendor said.

The 9320 comes with a range of protocols, including protocols that enable the device to communicate with Intermec's Model 9161A port concentrator. The 9320, which can be mounted beneath a workbench or adhered to a CRT terminal using Velcro strips, is priced at $565, the vendor said.

The 9161A handles bidirectional data traffic between a host computer and up to 16 Intermec bar code readers and printers or additional 9161A port concentrators. The 9161A concentrator features IBM Binary Synchronous Communications (BSC), Hewlett-Packard Co.'s HP 3000-compatible communications and an asynchronous EIA RS-232C, RS-422 or 20-mA current loop interface with Intermec's flexible poll/select protocol.

The basic 9161A has 16K bytes of random-access memory, expandable to 64K bytes for larger buffering requirements.

The 9161A is priced at $3,495 with 16K-byte memory and $3,920 with 64K-byte memory.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynnwood, Wash. 98036.

ATRON CORP.
Multibus Probe 86/88

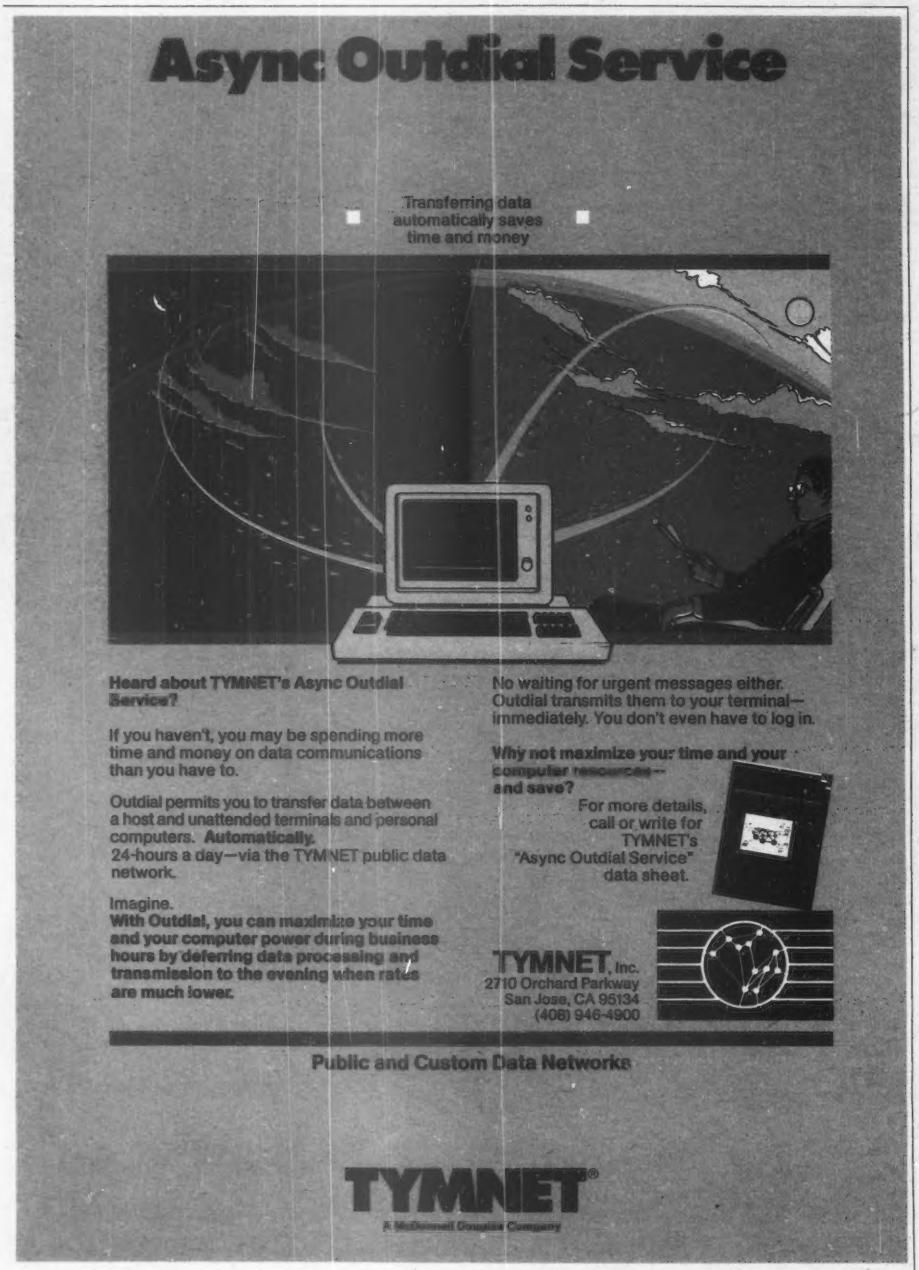
Atron Corp. has announced the Multibus Probe 86/88, a debugging tool for developers using Intel Corp.'s Multibus board. The unit plugs into an Intel 8086 or 8088 microprocessor socket on the target CPU card.

Optimized for standard high-level languages, the Multibus Probe contains all the necessary support for debugging both software and hardware. The Probe is compatible with software generated locally in a Digital Equipment Corp. RMX-86-based system or generated remotely on a DEC VAX or a personal computer downloaded into the Multibus Probe.

Multibus Probe features include real-time trace, hardware breakpoints on memory or I/O operations, symbolic debugging and an enhanced human interface. A performing and timing analyzer allows the user to display a histogram of the program's execution over time. The procedure duration measurement can profile the execution of individual procedures, and the program event count measurement can do a program event count analysis.

The Multibus Probe 86/88 is priced at $3,995 and will be available in August, the vendor said.

Atron, 20665 Fourth St., Saratoga, Calif. 95070.



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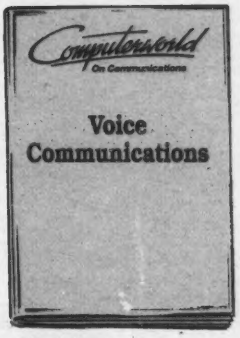

October

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KODAK from page 57

30M to 300M bytes. The system is also equipped with a streaming tape drive backup and an uninterruptible power supply, Kodak said.

Two different terminals, also supplied by Adds, come with the system. The standard terminal has a detachable keyboard and a video display that swivels. The other terminal contains a higher number of function keys and a numeric key pad and can drive a compact printer.

Kodak pointed out that when equipped with modem and data line, the terminals can be used remotely.

In addition to computer terminals, the information system employs the newly unveiled $15,500 IMT-250 microimage terminals for image retrieval. Although a number of microfilming devices can also be used with the system, Kodak said it is recommending use of the newly introduced $19,000 Reliant 2000 product.

The minicomputer runs a disk operating system software which Kodak described as based on the Pick & Associates, Inc. Pick operating system foundation enhanced by Adds, with the CPU running a virtual operating memory system. The packaged applications software, which Kodak said it expects to call Version 2.0, will include multiple data entry capability, check digit routines and batch data entry capabilities.

The smaller KAR-2200 system will be constructed around a 64K-byte Adds Model 2500 processor offering as much as 1,024M bytes of main memory. Used with 5¼-in. Winchester disk drives, the system will store from 27M bytes to 54M bytes of data.

Kodak described its microfilmer as a programmable device run by four microprocessors and having a "filmwrite" capability of inscribing an 11-digit address along document images on the microfilm. Kodak said the address would enable a retrieval device to locate a document from a file containing millions of other documents.

The microfilmer will also have the capability of recording documents in random batch mode instead of in sequential batches, according to Kodak.

Real-time operating system software for the microfilmer performs operating system checks and controls job setup, leading users through what Kodak called a "decision tree," resembling an abbreviated computer logon sequence. The software also monitors the microfilmer's performance.

Twenty-two applications programs are also available with the filming device, which also includes a 40-function keyboard and an LED message screen. The microfilmer, available in the fall, will accommodate multi-interchangeable film units for reductions of 24, 40 or 50 times original size.

The retrieval terminal introduced by Kodak was described by company spokesmen as driven by an on-board multiprocessor backed up by software to give the terminal the capability of acting upon information coded on microfilm or upon instructions from a computer.

When linked to a computer, the microimage terminal will display document addresses on its CRT screen. Users then insert the requested microfilm roll, which the computer downloads along with search instructions, functional commands and possible text messages.

The IMT-250 terminal can be equipped with a computer-assisted retrieval interface making it compatible with either asynchronous or synchronous computers. In asynchronous mode, the terminal has a bidirectional communications capability.

Kodak is at 343 State St., Rochester, N.Y. 14650.

VG from page 57

8250 display systems are said to be plug-compatible replacements for IBM display systems and are used with IBM and IBM-compatible computers for CAD/CAM and computer-aided engineering calculations.

VG Systems markets the systems directly to corporations and on an OEM basis to major suppliers of Cadam-based systems.

The VG 9250 is compatible with the VG 8250, using many of the VG 8250 modules.

The 9250 is said to narrow the performance gap between raster and vector display systems. The 9250 is capable of tracking 256 simultaneous colors out of a 16 million-color palette at any visible intensity.

VG Systems is at 21300 Oxnard St., Woodland Hills, Calif. 91367.

S6000 from page 57

Ion printing uses an ion projection cartridge that projects an electrostatic image directly on a dielectric drum with an array of charged particles. The ion printer uses four key components in a four-step process. Because the process is primarily electronic, the vendor said the ion printing mechanism requires fewer components than required by laser systems.

The ion printing system prints 6,000 to 12,000 line/min, depending on font style, with a reliability of more than 300,000 pages between failures, the vendor said.

The ion cartridge is rated for 125,000 copies and costs approximately $300 to replace.

Delphax Systems is located at 977 Pantera Drive, Mississauga, Ont., Canada L4W 2W6.

RUMOR from page 57

er of vehicles for other companies to make millions. If IBM chooses to base its networking strategy in hardware, it will unquestionably sell thousands of the units. Whether those users like the idea of using a hardware-based local-area network, especially if they are not privy to the details of how it operates, remains to be seen. But, then again, so does the product.

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The new 5300 family of printers from Teletype Corporation represents an exceptional value. The entire family combines our traditional reliability with a 200 cps speed that is ideal for business applications. You can choose a keyboard or auxiliary printer, both of which are available in 15-inch tabletop and 9½-inch compact sizes.

From the moment you take a 5300 out of the box and plug it into your system, you'll be amazed at how easy it is to operate. To begin with, you can downline load or simply push a button on the printer's control panel to set options. And just push another button to select an alternate option set for a different system. A 4-character LCD on the control panel provides all of the status indicators you need.

The 5300 is available with a built-in 300/1200 baud modem that saves desk space and makes it possible for the 5300 to do all dialing and logon functions. So you can access a CPU or timesharing network by simply depressing a key on the detached keyboard.

For printing versatility, the 5300 is hard to beat. It features graphics capabilities as well as emphasized, expanded and compressed printing. And when used as an auxiliary printer, the 5300 is well-suited for use with most ANSI display-based terminals such as the Teletype® 5410 and 5420.

You'll also appreciate the forms handling of the 5300. It is available with adjustable push or pull tractors; a roll paper holder, a supply rack and an accumulator.

Other features that make the 5300 an even better value include an interchangeable platen, acoustic adapter and a carrying case for the 9½" model.

The 5300 also has a built-in self-diagnostic system that lets you know when and where problems exist. And if you can't solve the problem, you can count on our product service organization for help. With offices nationwide, we're able to offer fast response time.

So if you'd like a printer that tops what you have now, check out the latest in our long-running line. Write Teletype Corporation, 5555 Touhy Avenue, Dept. 3223-F, Skokie, IL 60077. Or call 1 800 323-1229, ext. 701. **TELETYPE: VALUE SETS US APART.**

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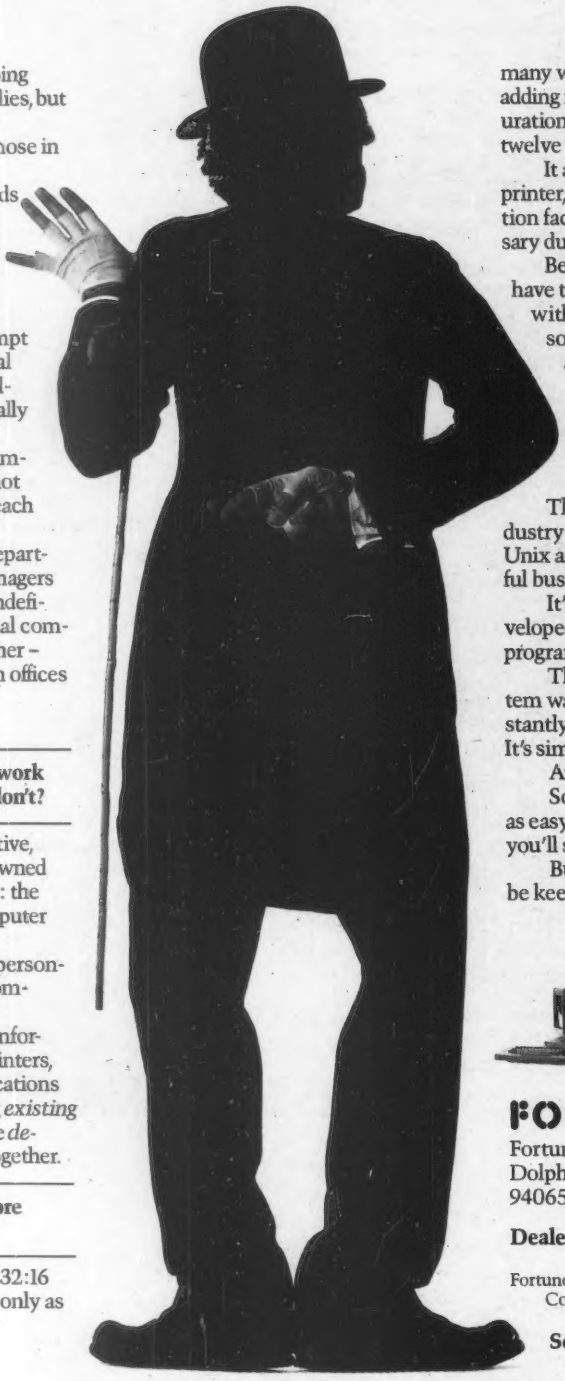

There's a lot of optimistic talk going on about networking today. Not lies, but perhaps wishful thinking.

Talk, in fact, that's making those in the know very nervous.

An alarming lack of standards among manufacturers has stalled the development of software applications packages for networked personal computers.

As a result, offices that attempt to connect their existing personal computers together find an appalling absence of programs that really share data.

Personal computers were simply designed for individual use, not for sharing information among each other within an office.

So, meanwhile, countless department heads, data processing managers and small business owners are indefinitely stuck with various personal computers that won't talk to each other – a predicament only acceptable in offices where no one works together.

But that's rarely the case.

Why should your employees work together on computers that don't?

We have a solution. A cost-effective, high performance solution renowned for its straightforward simplicity: the Fortune 32:16™ multi-user computer system.

It has all the capabilities of personal computers, but without the complication.

It's a computer for sharing information among users. Sharing printers, memory devices and communications facilities. And best of all, sharing *existing* multi-user applications software *designed* to allow users to work together.

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Economically, the Fortune 32:16 multi-user system lets you buy only as many workstations as you initially need, adding more later. Depending on configuration and application, it handles up to twelve users simultaneously.

It also requires no more than one printer, memory device or communication facility – eliminating much unnecessary duplication.

Because we don't think you should have to equip four or six or eight users with four or six or eight sets of personal computers, printers, disk drives and applications packages.

The Fortune solution comes as a complete, ready to use package – including software – designed from the beginning as a multi-user system.

The Fortune 32:16 runs on the industry standard Unix™ operating system. Unix affords you a wide variety of powerful business programs.

It's also an operating system developed for multi-user computers and programming flexibility.

The Fortune 32:16 multi-user system was made specifically for the constantly growing needs within businesses. It's simple, flexible and cost-effective.

And best yet, it's here now.

Someday, networking may become as easy as a multi-user solution. And then you'll see networked Fortune systems.

But until that day, a lot of people will be keeping their fingers crossed.

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Fortune Systems Corporation, 101 Twin Dolphin Drive, Redwood City, California 94065. (415) 592-5140

Dealer inquiries invited.

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MICROCOMPUTERS

MICRO BITS
Thomas W. Madron

Exec workstations need set hardware

The guiding principle in the selection of microcomputer hardware always should be the availability of appropriate software — not only those programs necessary to do substantive work, but also the integrating software needed to bind the programs together. For the software to be useful in an executive workstation, however, there are a few hardware features that the workstation must possess.

For external storage, a minimum useful configuration is two 40-track, 5¼-in., double-density, double-sided floppy drives. Winchester hard disks are available for most micros and represent a good, cost-effective option.

In addition, for specific applications it may be worthwhile to acquire more than two drives. Most microcomputer systems can handle at least four drives, and for some activities an appropriate configuration might feature two built-in floppies with a built-in or external hard disk.

Third-party vendors frequently produce disk options that are more cost-effective than those sold by the original system producers.

Communications needs also must be considered, and the workstation must be configured with an RS-232C serial port and/or a synchronous communications port. Many situations demand a workstation with more than one RS-232C port, a distinct possibility with most contemporary systems built around Intel Corp. 8086 or 8088 chips.

Other communications port options are available as well. The usual configuration for an RS-232C port supports asynchronous serial communications,

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Madron is manager of computer services at North Texas State University, Denton, Texas.

Software firms choose tactics

By Paul Korzeniowski
CW Staff

Most successful microcomputer software companies have grown from a foundation of one solid product, designed as a horizontal application to meet general needs for a wide range of users. Micropro International Corp. was built on Wordstar; Dbase II has become synonomous with Ashton-Tate; and Visi Calc spawned Visicorp.

But to continue expanding, microcomputer software companies are faced with a choice between two marketing approaches. They can add another cornerstone to their product line, or they can increase penetration in their area of expertise.

A number of companies have chosen the former approach, although it has not shown a great deal of success so far, experts noted. "The only company that has had more than one hit product was Microsoft [Inc.] with MS-DOS and Basic; no other software company has designed a second hit product," said Lorraine Mecca, president of Micro D, Inc., a Santa Ana, Calif., distributor.

Despite this lack of success, many companies are adopting this approach. Hayes Microcomputer Products, Inc., the leading manufacturer of microcomputer communications products, branched into the data base management arena with Please. Ashton-Tate, the leading data base management vendor, joined the integrated software fray with Framework. Microsoft has added word processing, graphics and project management packages to its software line.

A few companies, primarily word processing software suppliers, are adopting the second method. "We plan to expand our word processing line," said Wil Jones, president of Multimate International, Inc. "We hope to add other types of packages to our line, but that is in our future, not immediate, plans."

The first step in Multimate's immediate plans is a word processing package, geared toward middle managers and senior executives, that eliminates sophisticated word

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INSIDE

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IBM-compatible micro makers cut prices

Manufacturers of IBM Personal Computer-compatible systems continued to restructure their pricing in the weeks following IBM's June 7 price cuts. Among suppliers who lowered prices:

■ Columbia Data Products, Inc. in Columbia, Md., lowered system prices to a level 10% to 15% below IBM's new prices, the company said. Suggested retail cost for a Columbia desktop model with dual floppy disk drives, 128K bytes of random-access memory (RAM) and bundled application software is now $2,495. A similar version with 256K bytes of RAM, available next month, is priced at $2,695.

Portable systems with similar RAM and disk drives are priced equivalently, the company said. Models with 10M-byte hard disk drives cost $4,195 with 128K bytes of RAM and $4,395 with 256K bytes of RAM. Columbia is located at 9150-D Rumsey Road, Columbia, Md. 21045.

■ Corona Data Systems, Inc. in Thousand Oaks, Calif., cut its system prices between 11% and more than 20%. Cost for a desktop model with one floppy disk drive and 128K bytes of RAM is $2,195. Another model with two floppy disk drives and 256K bytes of RAM is priced at $2,595. A system with a single disk drive, a 10M-byte hard disk drive and 256K bytes of RAM will cost $4,095.

Again, portable systems similarly configured carry the same price tags as desktop models. Price for the company's new Personal Best personal computer, a hard disk model with dual floppy drives and 512K bytes of RAM, dropped to $5,095. Corona is headquartered at 275 E. Hillcrest Drive, Thousand Oaks, Calif. 91360.

■ Eagle Computer, Inc. in Los Gatos, Calif., lowered the cost for a single floppy drive PC Plus desktop system, with 128K bytes of internal memory, to $1,795. A similar model with dual disk drives will sell for $2,195. Another version with a 10M-byte hard disk drive, one floppy disk drive and 128K bytes of RAM is priced at $3,995. Costs for the top-of-the-line Turbo XL will remain steady at $4,994.

All these prices exclude monitor and

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NYC Blue Cross offers turnkey micro system for regional doctors

NEW YORK — Blue Cross and Blue Shield of Greater New York last month introduced a turnkey microcomputer system for physicians, designed to speed claims submissions and perform a variety of other office functions.

The Amicus I system will "streamline office operations, communications and financial transactions among physicians, patients and private and public health insurers," said Edwin Werner, chairman of the regional Blue Cross group.

Based on an IBM Personal Computer XT, the system features an Okidata Corp. Microline 93 printer, a Hayes Microcomputer Products, Inc. Smartmodem 1200 and a Davong Systems, Inc. streaming tape backup unit, along with software for patient billing, physician accounts receivable, financial analysis and management reports, Blue Cross said. The system's price, including installation and support, is $16,200.

Speedy transmission

In operation, Amicus will permit a physician's office to send electronic claims in less than 20 seconds to the master computer facility at Blue Cross headquarters here, shaving six or more days off reimbursement times, Blue Cross said.

As one indication of the need for quick turnaround, the organization said that it had processed almost 13 million Medicare B forms in 1983 alone.

Blue Cross will offer the system to more than 25,000 physicians in its 17-county region through a new division, Medical Business Services, the organization said. Amicus is aimed at groups with from one to five physicians.

Kathleen Beisty, Blue Cross vice-president for business and operational services and general manager of the new division, estimated that 85% of physicians in the New York area have not computerized their office operations.

Logical supplier

She claimed that Blue Cross will be a logical supplier because of its experience with both computers and health care delivery.

In addition to handling claims, the Amicus system will produce reminder letters for delinquent accounts, list patients according to diagnostic category and attending physicians, recall selected groups of patients for special clinical purposes and perform many other tasks, according to Blue Cross.

Amicus also will run standard IBM software and access on-line data bases, Blue Cross noted. Other potential applications are foreseen in electronic communications with clinical labs, medical centers and other physicians.

More information is available from Blue Cross and Blue Shield of Greater New York, which is located at 622 Third Ave., New York, N.Y. 10017.

Honeywell extends micro ability

WALTHAM, Mass. — Honeywell, Inc. has announced that a number of popular microcomputer packages now run on the company's Microsystem 6/10.

These packages include:

- Ashton-Tate's Dbase II data base management package.
- Computer Innovation, Inc.'s C86 C language compiler.
- Mag Software, Inc.'s Mag/base 1 personal filing system, Mag/base 2 information management system and Mag/base 3 applications development system.
- Micropro International, Corp.'s Wordstar word processing software, Mailmerge, Spellstar, Starindex (which generates tables of contents and indexes), Calcstar spreadsheet and Infostar information management system.
- Realworld, Inc.'s seven-package accounting system. A system that includes features such as accounts receivable, accounts payable, general ledger, payroll, inventory control and order entry billing, as well as sales analysis.

Microsystem 6/10 runs either Microsoft, Inc.'s MS-DOS software or software designed for Honeywell's DPS 6 minicomputer line, according to the vendor.

Honeywell is located at 200 Smith St., Waltham, Mass. 02154.

'Micro-Match' reference details micro interface with peripherals

PHILADELPHIA — Microcomputer users trying to link their machines to printers, minicomputers or mainframe computers may benefit from a reference released here recently that is said to detail most of the necessary interfaces.

Command Computer Corp.'s "Micro-Match" consists of bound directories, called Blueprints, which list which products interface and describes how to accomplish the link. "Micro-Match" also includes a set of research reports, called the "Access Forum," which discuss the considerations that arise when undertaking micro-to-mainframe and other types of connections. Three "Access Forum" reports are released yearly.

Command developed "Micro-Match" because "interfacing is not a high priority with most [vendor] companies," spokesman Joe Valley said. Microcomputer users find that hooking up most peripherals "takes anywhere from an hour to four hours," and that interfacing with a printer may require over four hours.

Valley added that many firms spend a great deal on custom-made cables when they could use standard cables, at much lower costs, if they only knew the interface's cabling requirements. The Blueprints spell out those requirements, as well as the correct switch positions and appropriate plugs, Valley said.

The "Micro-Match" reference, designed for use by employees without extensive technical backgrounds, is updated quarterly, Valley said. Command will provide customized interface designs for products not listed by the Blueprints at an additional cost, Valley said.

Command tested each product interface before listing it in the Blueprints and found that many produced "nothing but garbage on the screen" when the interface between them was tried, Valley said. In most cases, he said, the manufacturer's manuals were in error.

About 100 editions of "Micro-Match" have been sold since the reference's April introduction, Valley said. The product is being used primarily by corporations, especially those with a large number of microcomputers from different manufacturers, he said.

"Micro-Match" is available from Command Computer for $690/year. The Blueprints and "Access Forum" are not available separately.

Command Computer can be reached through P.O. Box 5096, Philadelphia, Pa. 19111.

DEC ships Unix micro system

MARLBORO, Mass. — Digital Equipment Corp. has announced shipments of Pro/Venix, a Unix-based operating system for its Professional series of personal computers.

The company now offers versions of Unix on all its processors from the VAX-11 series to the Professional 350, a spokesman noted.

Based on AT&T's Unix Version 7, Pro/Venix was developed for the Professional by Venturcom, Inc. of Cambridge, Mass. The multitasking, multiuser package includes an AT&T System 5 license to accommodate upgrades to newer versions of Unix, DEC said.

Pro/Venix includes C, Fortran 77, Pascal, Basic and assembler languages as standard, the company said. Standard Unix utilities, libraries and system calls reportedly are also included. Extensions to Version 7 include shared data segments, semaphores and code mapping, according to DEC.

The package requires a Professional 350 with a 10M-byte hard disk drive. Pro/Venix also is said to support an extended bit-map option; color and monochrome monitors; VT100 and VT52 terminals; LA50, LA100 and LQP02 printers; and DF02 and DF03 modems.

More information is available from DEC at 200 Baker St., West Concord, Mass. 01742.

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SOFTWARE

TOM SOFTWARE, INC.
A&M Manufacturing Business Management System

Tom Software, Inc. has introduced a manufacturing software package designed for Apple Computer, Inc., Hewlett-Packard Co. and other microcomputers.

The A&M Manufacturing Business Management System reportedly handles all the functions required by a company's administrative, accounting and sales staffs, while also providing information and reports needed for manufacturing and distribution operations.

The package reportedly includes 13 fully integrated modules, including general ledger/financial statements, accounts payable, accounts receivable, payroll, sales commission accounting, fixed asset accounting, production control, bill of materials, purchasing and receiving control, inventory control, material requirements planning and generalized subsidiary.

The software operates on a number of systems including Apple's Lisa 2, HP's HP 9000, Plexus Computer, Inc.'s 35 and 60, Wang Laboratories, Inc.'s 2200 series, Fortune Systems Corp.'s 32:16 and several other systems.

Prices range between $850 and $3,500.

Tom Software, P.O. Box 66596, 127 S.W. 156th St., Seattle, Wash. 98166.

VALET SYSTEMS
XT/Valet

Valet Systems has introduced its XT/Valet applications manager for the IBM Personal Computer and compatible models.

XT/Valet reportedly offers four menu pages of 15 application entries each for execution of up to 60 different applications. Integrated functions are said to include an annual calendar with daily reminders for important events, an alarm clock, a video display dimmer and a calculator.

Password protection reportedly also is provided to lock the system when not in use.

XT/Valet is priced at $95.

Valet Systems, 422 Juniper Court, Sunnyvale, Calif. 94086.

TEKNOWLEDGE, INC.
M.1

Teknowledge, Inc. has announced M.1, a software tool said to be designed to explore knowledge-engineering applications.

Running on the IBM Personal Computer, M.1 may be used to design, build and run stand-alone knowledge systems to solve problems, the vendor said.

M.1 reportedly employs an English-like language to build a knowledge base. M.1 engages the user in a question and answer consultation and draws on the knowledge base to reason about the problem to make a recommendation or draw a conclusion, according to the vendor.

M.1 can be mastered by people with programming experience, but does not require a background in knowledge engineering, Teknowledge said.

M.1's basic single-CPU price is $12,500, which includes a four-day training course and one year of maintenance.

Additional CPU licenses are $2,500 each; additional course participants are charged $5,000 each, which includes an additional CPU license.

Teknowledge, 525 University Ave., Palo Alto, Calif. 94301.

AUTODESK, INC.
Autocad-to-Intergraph Translator

Autodesk, Inc. has introduced its Autocad-to-Intergraph graphics translator for two-way graphics transfer of data between microcomputers running Autocad software and mainframe computer-assisted design (CAD) systems running Intergraph Corp.'s Intergraph CAD software.

The Autocad-to-Intergraph Translator reportedly offers users the ability to automate the work of designers, engineers and draftsmen while reducing cost per CAD workstation and decentralizing design tasks.

The translator also reportedly allows markup procedures to be carried out at micro workstations running Autocad and permits designers at remote locations to automate and communicate drawings.

Continued on page 70

1984 See us at NCC '84
BOOTH H733-735

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Everything you need is in the box.

Imagine being able to connect your PCs simply and inexpensively into a true full-function local area network.

Now you can . . . with 10-NET, a complete package designed so that you can easily install, learn and use it immediately. Everything you need to connect one PC into the network is included.

10-NET is uniquely different from other LAN products in that it requires no dedicated hardware to serve the rest of the network. It is a truly distributed system where your resources may be shared, including expensive hardware and application programs.

You can also share as much or as little data as you wish, with total data integrity and selective security.

You get built-in extras, too: like electronic mail; calendar; "Chat," a user-to-user communication facility; printer spooling; and "News," a bulletin board function for network users.

And, you can create a multi-user DBMS with unbelievable power and flexibility when you use 10-NET with 10-BASE, a powerful, easy-to-use DBMS designed specifically to work with 10-NET.

Invest in 10-NET now. You can start simple, and expand as your business grows. And, at $695* you won't find better performance or value, anywhere.

Ask your software dealer for 10-NET, or call 1-800-358-1010 (1-800-782-1010 in Ohio), and start getting some real work done. Dealer inquiries welcome.

*suggested retail

10-NET SPECIFICATIONS

HARDWARE:
PC plug-in circuit card, tap box, and cable to connect them
Type: Carrier Sense Multiple Access with collision avoidance
Speed: 1.0 million bits per second
Distance: up to 3,000 ft. between repeaters

SOFTWARE:
Share any DOS-supported hardware device
No dedicated server required
Concurrency control—implicit & explicit
Security—User, File, Node ID
Ethernet compatibility—addressing & message format

SYSTEM REQUIREMENTS:
- IBM PC, XT or compatible
- PC-DOS 2.0, MS-DOS 2.0
- 128K RAM
- One or more disk drives
- A cursor addressable monitor
- Media: simple twisted pair wire

Specifications subject to change without notice.

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Send to: Fox Research, Inc., Attn: National Sales Manager, 7005 Corporate Way, Dayton, Ohio 45459.

CW 7-2

Continued from page 69

The product runs on a number of microcomputers including the IBM Personal Computer XT and compatibles, Digital Equipment Corp.'s Rainbow 100 and 100 Plus, NEC Corp.'s Advanced Personal Computer, the NCR Corp. Personal Computer, Texas Instruments, Inc.'s Professional and microcomputers using Digital Research, Inc.'s CP/M 80 operating system.

A site license agreement for the translator costs $10,000.

Autodesk, 150 Shoreline Highway, Building B, Mill Valley, Calif. 94941.

INSTITUTE FOR INFORMATION MANAGEMENT
OPT

The Institute for Information Management has announced a series of personal computer-based educational and planning programs designed to help executives manage their information resources.

The Organizational Planning Technique (OPT) reportedly consists of various modules that let managers and analysts model "what-if" scenarios about information systems resources and determine the impact on services provided to the organization.

The series is said to consist of menu-driven software packages, documentation, tutorials, case studies, instruction and direct-line support.

Users can utilize case studies to explore options and to see results presented in tabular and graphic form, the Institute said.

OPT runs as a template over Lotus Development Corp.'s 1-2-3 and requires 640K bytes of usable memory on an IBM Personal Computer or Personal Computer XT or compatible machine. The personal computer must have two floppy disk drives or a compatible hard disk and run under DOS 2.0, the vendor said.

The first available module, OPT/Sensitivity Analysis, costs $2,000. The company said it plans to add 11 other modules.

Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

PORTABLE SOFTWARE
PortaAPL

Portable Software has introduced its PortaAPL sofware package, an interpreter for the APL language. PortaAPL reportedly contains all of the primitive APL functions, systems functions and systems commands of the IBM/ACM APL standard, except for shared variables.

Written in the C language, PortaAPL reportedly can be used on the IBM Personal Computer, Digital Equipment Corp. VAX-11 models and machines based on the Motorola, Inc. 68000 processor. APL programs can easily be moved from one machine type to another, according to Portable Software. Two system commands reportedly allow work spaces to be transferred between different types of computers.

PortaAPL is available for $195 on the IBM Personal Computer, $395 on Motorola 68000-based machine, and $2,995 on DEC VAX-11 models, the vendor said.

Portable Software, 60 Aberdeen Ave., Cambridge, Mass. 02138.

APPLIED BUSINESS TECHNOLOGY CORP.
Advanced Project Manager Workbench Release 2.0

Applied Business Technology Corp. has introduced an enhanced version of its Advanced Workbench, a decision support system for project managers.

The package is designed to plan and control projects where resources are a major management consideration.

Advanced Workbench Release 2.0 runs on the IBM Personal Computer, Personal Computer XT and compatible machines.

The Advanced Project Manager Workbench is priced at $1,150 and includes software upgrades for one year.

Applied Business Technology, 76 Laight St., New York, N. Y. 10013.

COMMUNICATIONS

COSMOS, INC.
R/Link; R/Comm

Cosmos, Inc. has announced two communications enhancements to its Revelation software, an applications environment and relational data base for the IBM Personal Computer.

One enhancement, R/Link, reportedly makes Revelation compatible with semaphore-locking local-area networks via an optional module.

The second enhancement, R/Comm, provides asynchronous communications between Personal Computers running Revelation and minis and mainframes.

R/Comm and R/Link are priced at $1,495 each. Both will be available in the third quarter of this year.

Cosmos, Suite 102, 19530 Pacific Highway S., Seattle, Wash. 98188.

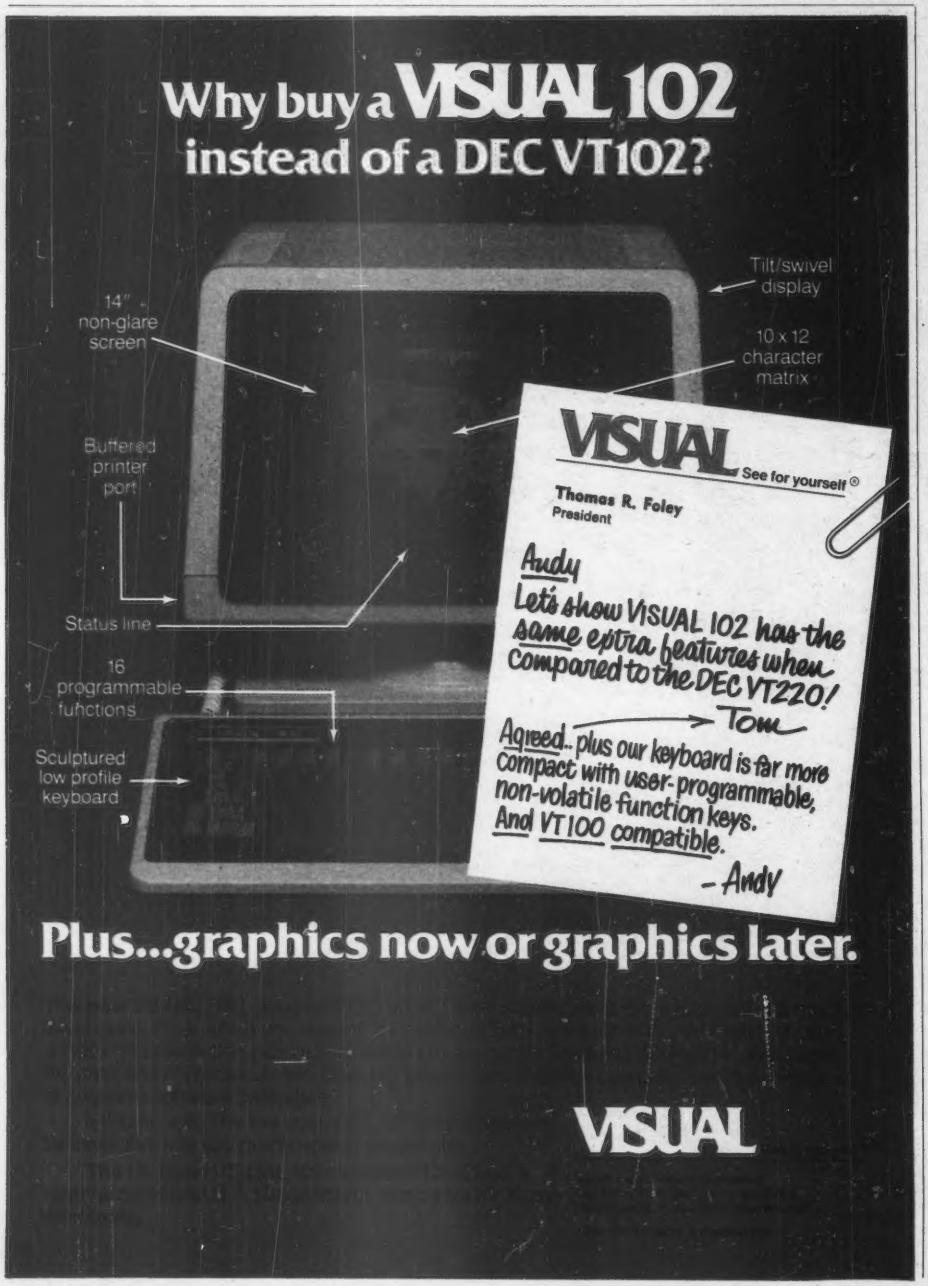
SOFTREND, INC.
Auracom

Softrend, Inc. has announced a communications module for its Aura integrated software package, an applications developer that includes word processing, data base management and business graphics.

Called Auracom, the communications module reportedly features menu-driven operation that matches Aura's design and user practices and allows communications functions to be executed in single keystrokes.

Auracom will be available in October, priced at $150.

Softrend, 2 Manor Pkwy., Salem, N.H. 03079.



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but large organizations may require synchronous communications employing protocols such as IBM's bisynchronous or Systems Network Architecture/Synchronous Data Link Control systems. Or it may be necessary to have the micro communicate as a standard IBM 3278 display station, attached to a controller with a coaxial cable; 3270-type devices also come in versions with a synchronous RS-232 port.

Communications setups obviously will require assistance from and coordination with the central computing facility.

An executive workstation also must have the ability to communicate with a printer through something other than the RS-232C port, especially if there is only one such port. The latter consideration now generally means having a Centronics Data Computer Corp.-type parallel printer port available. Alternative parallel standards such as the IEEE-488 port also can support printers or other devices. A workstation need not have a printer attached, although most people find that desirable. But it must have the ability to produce printed copy when necessary.

Another issue is whether the keyboard is an adequate input device. Many manufacturers feel that executives do not wish to use keyboards and offer other input devices such as the mouse. A mouse is a device that is rolled around a desktop to control cursor movement.

Although the light pen has not proven very popular in microcomputing, this device also provides an easy method for making selections and is relatively inexpensive. When the light pen is pointed at some location on the screen, the micro can calculate that location and then either move the cursor or simply select that item. If software support is available, light pens may be useful in graphics design.

Still another option, likely to become popular during the 1980s, is voice I/O.

However, any of these specialty devices require appropriate hardware support, in the form of the correct port, and also require adequate software support.

Sufficient internal memory represents another requirement. Especially among microcomputer users weaned on Zilog, Inc. Z80-based systems, the amount of memory required for some of the newer micros seems extravagant. The 8086/8088 family of processors requires at least 128K bytes of memory, and 256K bytes is very useful for applications now on the market.

Moreover, some applications that run nicely in 256K bytes under MS-DOS 1.1 or CP/M 86 fail to function under MS-DOS 2.0 or Concurrent CP/M 86, because the newer operating systems require substantially more memory. Once memory of 512K bytes or more has been added, micros can handle applications previously available only on large mainframes.

In an organizational environment, a useful workstation should have at least 256K bytes of memory, and because memory is relatively cheap, initial configurations with 512K bytes should be considered.

Finally, workstations used by people who travel frequently must be designed for easy portability.

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monitor adapter board; a monochrome monitor will cost $275, and the required board will cost $225.

An Eagle Spirit portable with 128K bytes of RAM and dual floppy drives will cost $2,695, while a portable sytem with a 10M-byte hard disk drive and one floppy drive will sell for $3,995.

Beginning July 1, all Eagle systems will be offered with 256K bytes of internal memory standard, the company said. This move reportedly will not affect pricing. Eagle's address is 983 University Ave., Los Gatos, Calif. 95030.

■ ITT Information Systems Division in Tempe, Ariz., cut prices for its Xtra personal computers up to 24%. Price for a system with one floppy disk drive and 128K bytes of RAM is $2,495.

Another model with dual floppy disk drives and 256K bytes of internal memory now will sell for $2,995. A system with a 10M-byte hard disk drive, a floppy disk drive and 256K bytes of RAM will cost $4,995, the firm said.

ITT Information Systems can be contacted through P.O. Box 52016, Phoenix, Ariz. 85072.

CHOICE from page 67

processing features.

The executive word processing program is the first in a series of vertical market programs that Multimate will announce this year, according to Jones.

Another word processing company, Lifetree Software, Inc., developer of the Volkswriter series, recently released a scientific word processing program. Other vendors are said to be preparing to ship word processing programs for lawyers, marketing departments and salesmen.

Rewriting a program for specific markets compromises manufacturer and customer needs, and some markets may not justify a software developer's expenses, executives said. Each customer operates in a unique manner, and no off-the-shelf package will fully meet each company's requirements, they remarked.

Multimate plans to alleviate these compromises by selling site licenses to customers and permitting them to tailor the program, Jones said. "This will allow them to use the program as they wish and allow us to serve our customer base."

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COMPUTER INDUSTRY

IBM subject of Justice inquiry

Government, Big Blue stress triviality of action

By Peter Bartolik
CW Staff

WASHINGTON, D.C. — IBM is once again the subject of a U.S. Justice Department antitrust investigation, but both the company and the government department have gone to great pains to stress that the action is relatively trivial and routine.

Responding to requests by Bob Djerdjevic, industry analyst and newsletter editor, the Justice Department's Antitrust Division informed Djerdjevic it had initiated an investigation to determine whether IBM's out-of-court settlement last year [CW, Oct. 17] with Hitachi Ltd. over trade secrets misappropriation "raises any significant problems under the antitrust laws," according to a spokesman for the department's Antitrust Division.

However, spokesman Mark Sheehan said the investigation "is much more trivial" than initial reports indicated. Both the government and IBM spokesmen stressed the investigation was not of the magnitude of the 10-year antitrust action against IBM that was dropped in January 1982. Sheehan said, "It is not at all a significant investigation," and an IBM spokesman classified that action as "a routine kind of inquiry."

Sheehan said the investigation was prompted by media reports that Hitachi had agreed to share knowledge of its own products with IBM prior to marketing those products. "It's a preliminary investigation. We haven't turned it into a formal investigation and may not," he said.

In a interview published this week in *Computerworld* (see story on page 6), IBM President John F. Akers earlier in the month noted IBM had won all of many private antitrust lawsuits and a 10-year-old government action, and he expressed confidence no such action "is on the horizon." Akers declared IBM's determination that its trade secrets not be stolen.

Djerdjevic, editor of "Annex Computer Report," in letters to the U.S. Senate and the Justice Department, sought an investigation into whether IBM used its resources and marketing position to obtain a settlement against Hitachi that would reduce the Japanese vendor's competitive abilities. In a settlement filed with the U.S. District Court in San Francisco last October, Hitachi disputed IBM's claims to misappropriation of trade secrets, but nevertheless agreed to allow IBM to inspect within 60 days of first commercial shipments any new Hitachi products and to submit all future disputes to binding arbitration. Later reports surfaced, however, that Hitachi also had signed another agreement stipulating payments to IBM of as much as $300 million for use by Hitachi customers of operating systems software alleged by IBM to infringe upon IBM proprietary software.

Djerdjevic told *Computerworld* recently "no competitor in his right mind" would allow IBM inspection of competitive products and waive the right to pursue conflicts through the courts. "It appears that IBM is setting up its own out-of-court system away from the public eye," Djerdjevic charged.

Assistant U.S. Attorney J. Paul McGrath, head of the antitrust unit, responded in a letter to Djerdjevic that IBM apparently had a legitimate right to sue Hitachi in court over bona fide disputes. He also said, however, "The fact that IBM can use the court to pursue its claims does not mean that it can lawfully extract from its opponent settlement terms that have anticompetitive effects."

IBM spokesman Peter Kuhn said the company voluntarily complied with a request from the antitrust unit to provide

See IBM page 80

Franklin latest firm to seek shelter under Chapter 11

By David Olmos
CW Staff

PENNSAUKEN, N.J. — Franklin Computer Corp., crippled by declining sales of its personal computers and a costly legal battle with a competitor, has become the latest industry casualty.

Morton E. David, Franklin's new chairman and chief executive officer, announced June 22 that the company had filed for reorganization under Chapter 11 of the Federal Bankruptcy Act.

"The company's management is exploring every potential opportunity" to reorganize itself, company spokeswoman Susan Gauff said last week.

Under Chapter 11, Franklin will be protected from lawsuits by its creditors while it comes up with a plan designed to settle its debts.

According to court documents filed in Philadelphia, Franklin claimed assets of $33.9 million and liabilities of $22.8 million.

Three of the company's five largest unsecured creditors were computer companies, including Texas Instruments, Inc., which it owes $920,000; Key Tronic Corp., $691,000; and Apple Computer, Inc., $657,000. Franklin also owes $4.9 million to its largest secured creditor, National Westminster Bank USA.

The latest in a series of distress signals from Franklin came last month when the company laid off 160 of 275 employees, citing sagging personal computer sales and difficulties in obtaining disk drives for its new CX series. Early this year, the company's work force numbered 450.

One factor in Franklin's bankruptcy filing stems from costs associated with a copyright infringement suit brought by Apple, which challenged the software

See FRANKLIN page 80

■ Osborne Computer Corp. is revived, refocused and ready to go. The reorganized company's new president was interviewed recently on plans to bring the bankrupt company back into the limelight/76

■ Digital Equipment Corp. won't be dealing with Computerland Central after August, with DEC saying it's in its own best interest to pursue individual deals with Computerland franchises/77

■ IPL Systems, Inc. recently disclosed a large cutback in its work force/78

NCC's year of living dangerously

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

Just a few random thoughts while packing fatigues and venom antidote for the National Computer Conference in Las Vegas next week:

Why?

Does NCC have a death wish, or what?

A year after the Anaheim sweatbox, the conference is going to dry out in the desert and maybe dry up whatever reserves of goodwill remain among traditional NCC trekkies.

The only people who seem to relish the event are the conference organizers.

Among participants who have dropped by this corner of the world in recent weeks, the standard emotion seems to be dread.

Las Vegas may be a nice enough place for eloping couples in the spring, but no amount of air conditioning can belie the fact that the average outside temperature during the daytime is 104 F. Unless you're a compulsive gambler or a dedicated Wayne Newton groupie, Las Vegas in the summer has very little to offer.

Anybody want to sign up to fry eggs atop the Hoover Dam?

With the ever increasing list of computer shows from which to choose these days, NCC could fast lose its appeal among vendors with a couple more examples of this creative scheduling.

■

If you're intent on shunning the casinos and the showrooms in Vegas, you might try and scrounge up one of the advance copies of *Hypergrowth: The Rise and Fall of Osborne Computer Corp.* by Adam Osborne and John Dvorak, which is supposed to hit the bookstores sometime this month.

See NCC page 80

Cbema appeals to Asian states for aid against high-tech pirates

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The computer and software industry is mounting a campaign to fight the piracy of its products internationally, citing losses of at least $1 billion.

The Computer and Business Equipment Manufacturers Association (Cbema), representing U.S. computer and software manufacturers, last month met with government representatives of Taiwan and Singapore to encourage them to "stop illegal copying of American products."

Cbema President Vico Henriques reported that the Taiwanese government "agreed to adopt and publicize a policy statement emphasizing the government's opposition to counterfeiting and its intention to rid Taiwan of the problem of infringement."

Taiwan's copyright laws are currently in the process of being rewritten, and Cbema said it was able to discuss with government officials the sections of the proposed law dealing with hardware and software infringements and the "particular problems of detection and policing counterfeit products."

Henriques said that the meeting with Singapore officals was less successful because government policy does not support membership in either of the two world conventions on copyrights. "As a result, the provision of adequate and effective protection for intellectual works is impossible," Henriques said. "The problem is further confounded by the desire by some in the Singapore government to separate software protection from copyright protection. This position is unacceptable to the U.S. and to the industry."

The Cbema offical said that a strong plea was made to the government of Singapore to issue a policy statement opposing piracy, but the plea was rejected.

See PIRACY page 80

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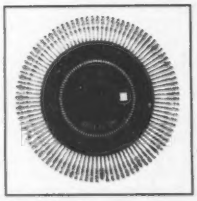

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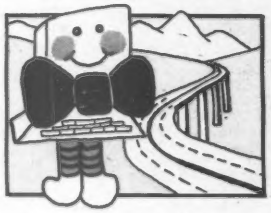

The German computer market is the largest in Europe and the third largest in the world. It has over $11 billion in installed general purpose computers. The fastest growing segment of the German computer market is the microcomputer, with an installed value of $283 million. There were 10,000 IBM PC's sold in 1983 and another 30,000 units including IBM PCjr's are expected to be installed by the end of 1984.

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Standardized contract clauses: winning battles, losing the war

LEGAL VIEW

By Christopher M. Mislow
Special to CW‡

Second in a three-part series.

The rising tide of lawsuits against computer systems vendors has not escaped the attention of the larger manufacturers. Since approximately the mid-1970s, IBM, Burroughs Corp., Sperry Corp. and others similarly positioned in the industry have relied upon standardized contract clauses to avoid liability to their customers.

Four types of clauses predominate among these standardized provisions: disclaimers of warranties, integration clauses, limitations of remedies and clauses shortening the time period during which lawsuits may be commended.

As discussed last week, express warranties often arise in conjunction with the sale of a computer system, and implied warranties do so almost invariably. The parties to a sale may, however, agree otherwise. This is the function of a clause disclaiming the existence of any warranties.

A typical disclaimer provides that the vendor "does not make any express or implied warranties, including but not limited to the implied warranties of merchantability and fitness for a particular purpose." By signing a contract containing such a disclaimer, a purchaser waives his right to insist that the system perform up to standards and hence waives his right to sue when it fails to do so.

Integration clauses

An integration clause disclaims the existence of any statements other than those contained in the written contract itself, thereby integrating the entirety of the parties' agreement into the single document. One such clause successfully invoked by Burroughs, for example, excluded all "understandings, agreements, representations or warranties . . . not specified herein."

In effect, integration clauses permit "bait-and-switch" sales tactics. When employed in conjunction with warranty disclaimers, moreover, integration clauses become especially potent weapons: The integration clause negates all the glowing product descriptions made by the vendor's salesman; the warranty disclaimer then negates even the minimal product standards ordinarily contemplated by the purchaser.

Clauses limiting a user's remedies serve as a secondary line of defense. In those instances where a user is able to establish a vendor's liability for computer malfunction, whether under a breach of warranty or other theory, these clauses limit the relief to which the user is entitled.

Limitation of remedy clauses specify the user's exclusive remedy — usually the repair or replacement of defective components — and disclaim liability for damages.

Deadlines for filing suit

The fourth common technique used to restrict the liability of computer vendors is the insertion of a clause shortening the otherwise applicable deadline for filing suit.

Where a user attempts to work with a vendor to eliminate system problems, rather than dashing to the courthouse door, the delay can be fatal. IBM, for example, managed to avoid payment of $11 million in damages to a user who had filed suit more than a year after the installation of a malfunctioning computer system. IBM successfully relied upon a contract provision that "no action, regardless of form, arising out of the services under this agreement, may be brought . . . more than one year after the cause of action has accrued."

Standardized contract clauses suffer a number of practical drawbacks. At the outset, a user may simply refuse to accede to these provisions. Although smaller users invariably find themselves in a take-it-or-leave-it situation, larger users, or users utilizing a pooled purchasing arrangement, are in a better position to negotiate terms.

Perhaps the greatest shortcoming of relying solely on standardized contract provisions, though, is the myopic perspective of such an approach. It represents a classic example of winning the battle while losing the war. The ultimate goal, after all, is not to win a lawsuit at the expense of customer goodwill and industry reputation, but rather to obviate or at least amicably resolve any disputes that may arise.

Next week: A holistic approach.

Mislow is an attorney with the Salt Lake City firm of Giaque and Williams.

ITT lands GSA phone contract

NEW YORK — ITT Corp.'s Communication Services Group has received contracts said to be worth $97.9 million to provide private-line, long-distance telephone services to the federal government.

The contracts, which are from one to three years, were awarded to ITT by the General Services Administration (GSA), which has the largest private telephone network in the world.

The GSA also awarded MCI Communications Corp. a contract valued at $6.6 million and Western Union, Inc. a contract worth $8.4 million, according to a GSA spokesman.

Forge bond with MIS managers to impact market, AT&T advised

By Robert Batt
CW West Coast Bureau

SAN JOSE, Calif. — For AT&T to have a major impact in the computer industry, it must forge a much closer relationship with MIS managers than exists at present.

That was the view offered by Skip Bushee, executive vice-president at Infocorp, a Silicon Valley-based market research firm, in a recent speech here to senior industry executives.

Speaking at Infocorp's Mid-Year Forum, Bushee said AT&T's current strength lies in its access to communications managers. However, he added, it is far from clear that communications and MIS management functions will be combined in the future, thereby automatically allowing AT&T direct access to the computer market in large organizations.

Bushee said AT&T's tremendous technological and financial resources do not guarantee it success in the computer industry. He offered as an analogy the example of Xerox Corp., which, he claimed, has found it difficult to translate its technological prowess and access to office managers into access to MIS managers.

"The No. 1 key to success is access to markets. Without a doubt, those companies that can identify and focus their resources in a specific market segment are the ones that are going to be successful. Those that don't will not be, it's as simple as that," he asserted.

The major weaknesses currently afflicting AT&T, Bushee contended, are that it is a newcomer to the computer systems business and the fact that, because of the recent deregulation, it is still undergoing substantial internal change. The company, he warned, will need to create much greater coordination with its subsidiaries than it has so far.

Over the longer term, Bushee suggested, AT&T should focus on computer products that have some kind of communications application, such as on-line transaction processing, thereby playing to the company's strengths while gaining the attention of MIS professionals.

"It is very important for computer manufacturers to become established in the minds of users, and for this reason it is also important that AT&T generates a direct sales force to concentrate on the markets it is going after," he added.

Despite the difficulties, Bushee said, AT&T is clearly the major new player in the computer arena and, through the use of technology, is likely to have a significant impact. This is already being demonstrated, he suggested, in the tendency of end users to follow AT&T's lead and adopt the Unix System V version of the company's operating system.

Bushee

AT&T's entry into the computer market will also help to stimulate market growth for microsystems, the analyst predicted, particularly those priced between $100,000 and $350,000. According to Infocorp, the company will capture 45% of the worldwide unit growth in this market during 1984.

Furthermore, Bushee claimed, AT&T is increasingly being seen as the one clear alternative to Digital Equipment Corp.'s VAX product line, particularly those products that incorporate Unix.

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Osborne redirects focus, targets international market

By Robert Batt
CW West Coast Bureau

HAYWARD, Calif. — Linking its microcomputers with mainframe and minicomputer systems is an essential strategy for the newly reorganized Osborne Computer Corp., its chief executive said recently.

In a telephone interview following last month's U.S. Bankruptcy Court approval of the firm's reorganization plan, Ronald Brown, Osborne's new president, said the company is no longer interested in simply competing in the IBM Personal Computer plug-compatible arena.

Osborn's long-promised IBM-compatible, to be unveiled this fall, is simply a spin-off from the old company, according to Brown, who was an Osborne vice-president prior to the filing of bankruptcy.

"The new company is radically different from the old one," he asserted. "While we will continue to sell our existing products in the market, we are now much more interested in developing specialty areas such as communicating with mainframes or competing in the [educational] market."

One of Osborne's key strategies, Brown said, is to market products that can hook up to CPUs, minis or shared processors made by Burroughs Corp., Digital Equipment Corp., Sperry Corp., ICL Ltd. or Siemens AG, as well as to provide standalone machines.

Under the terms of the reorganization, Osborne plans to subcontract or license its manufacturing requirements to third-party vendors. In effect, the company will become a trading company with its focus on the international market, Brown said.

The company's first product to be released under this new strategy was introduced in London recently. Called, the Osborne Encore, the 8-lb, 16-bit transportable is intended for markets outside of the U.S.

As a result of the court's decision, Osborne will pay its 800 creditors $15.5 million, plus a 20% ownership of the restructured company. According to Osborne officials, the company has paid out $6.5 million to date, with the remaining $9 million due over the next 15 months.

In September, when the company filed for court protection under Chapter 11 of the Federal Bankruptcy Act, it had debts exceeding $40 million.

Osborne plans to raise additional capital through a research and development contract for new hardware products. This contract will be in the form of an equity partnership, whereby partners will be able to exchange their rights to the new products for stock in the firm.

Adam Osborne, the firm's mercurial founder, will remain on the board of directors, but will not play an active part in the day-to-day management of the company, Brown said.

The reorganization, Brown claimed, is a turning point for the personal computer industry "because it demonstrates that a company in trouble can pull itself up by its bootstraps."

Six senior execs at Eagle resign

LOS GATOS, Calif. — Eagle Computer, Inc. has announced the resignation of six senior executives as part of a major management restructuring.

The director of strategic planning, together with the vice-presidents of product planning, operations, engineering, finance and marketing have all resigned by "mutual accord," the company stated. In addition, two board directors, including cofounder Gary Kappenman, have also resigned.

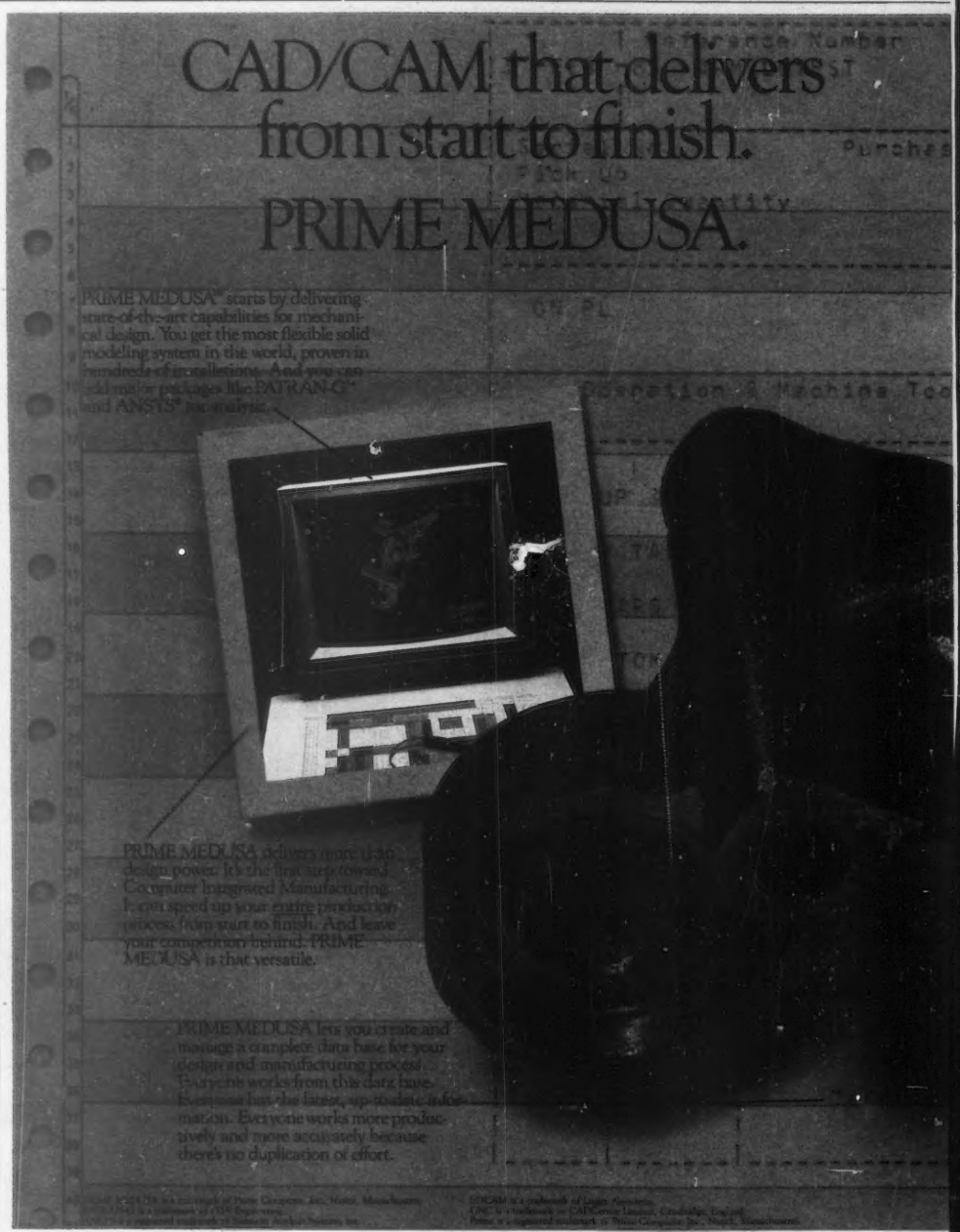
With Eagle posting third-quarter losses of $9.9 million and its debts totaling $10.8 million, the company said it has no plans to hire new people, and the duties performed by these former executives will be assumed by current employees.

National Semi profits rise

SANTA CLARA, Calif. — National Semiconductor Corp. recently reported 1984 profits of $63.9 million, or 75 cents per share, compared with a year-earlier loss of $14.1 million, or 20 cents per share. Revenues for the year were $1.6 billion, compared with $1.2 billion a year earlier.

For the fourth quarter ended May 31, the company reported profits of $24.4 million, or 28 cents per share, more than triple the year-earlier profits of $7.7 million, or 11 cents per share. Revenues for the fourth quarter were $470.8 million, 47% more than the year-earlier period.

The company said it spent more than $270 million on capital expenditures for the year, more than double the expenditures in 1983. The firm's research and development spending increased 38% to $158.5 million in 1984.



DEC to sell directly to franchises

MAYNARD, Mass. — Computerland Corp.'s central purchasing arrangement for Digital Equipment Corp.'s personal computers will not be renewed upon expiration in August, but DEC will contract directly with individual Computerland franchises for the sale of its products.

DEC announced the change June 20, indicating at that time the decision was "in line with our overall strategy to focus our small business effort on selected vertical markets which are compatible with our long-range product plans and support programs," in the words of Joel Schwartz, vice-president of DEC's Personal Computer Group.

Chad Hill, spokesman for Computerland, said the decision was mutual, with both companies agreeing "the volume of DEC products moving through Computerland was not high enough to warrant" a renewal. Nevertheless, he said, "the relationship is still strong."

DEC spokesman Joe Codispoti said the new arrangements to be worked out with individual franchises are positive "from the standpoint of continuing to focus our retail strategy where it makes most sense."

Noting that the company has spent two years developing administrative and marketing resources, Codispoti said DEC will not face logistical problems dealing with individual franchises.

Visicorp president resigns; firm says unrelated to recent layoffs

SAN JOSE, Calif. — Visicorp's president and chief operating officer since 1980, Terry Opdendyk, resigned June 18 to "pursue another business opportunity."

The company announced that Daniel H. Flystra, chairman and chief executive officer, would assume Opdendyk's responsibilities effective immediately. No other management changes have been made, the company said.

Opdendyk's resignation follows the company's layoff last May of 40 of its 210 employees. The company said the work force reductions were necessary because of less-than-expected first-quarter revenues.

Visicorp has been struggling for the past year under slumping sales of Visi Calc, the industry's first spreadsheet program. Visi Calc, which reportedly still accounts for more than half the firm's sales, has taken a beating from competitors such as Lotus Development Corp.'s 1-2-3 package.

Visi Calc has also become the subject of litigation between Visicorp and Software Arts, Inc. of Wellesley, Mass., which actually developed the product. Software Arts has charged Visicorp with failing to market the product properly, while Visicorp responded with allegations that Software Arts failed to enhance the product in a timely manner. Software Arts also has fallen on hard times, announcing recently it had laid off 60 employees.

Visicorp has also been disappointed by sales of Visi On, its integrated applications management program. Shipments of Visi On began last December after lengthy development delays.

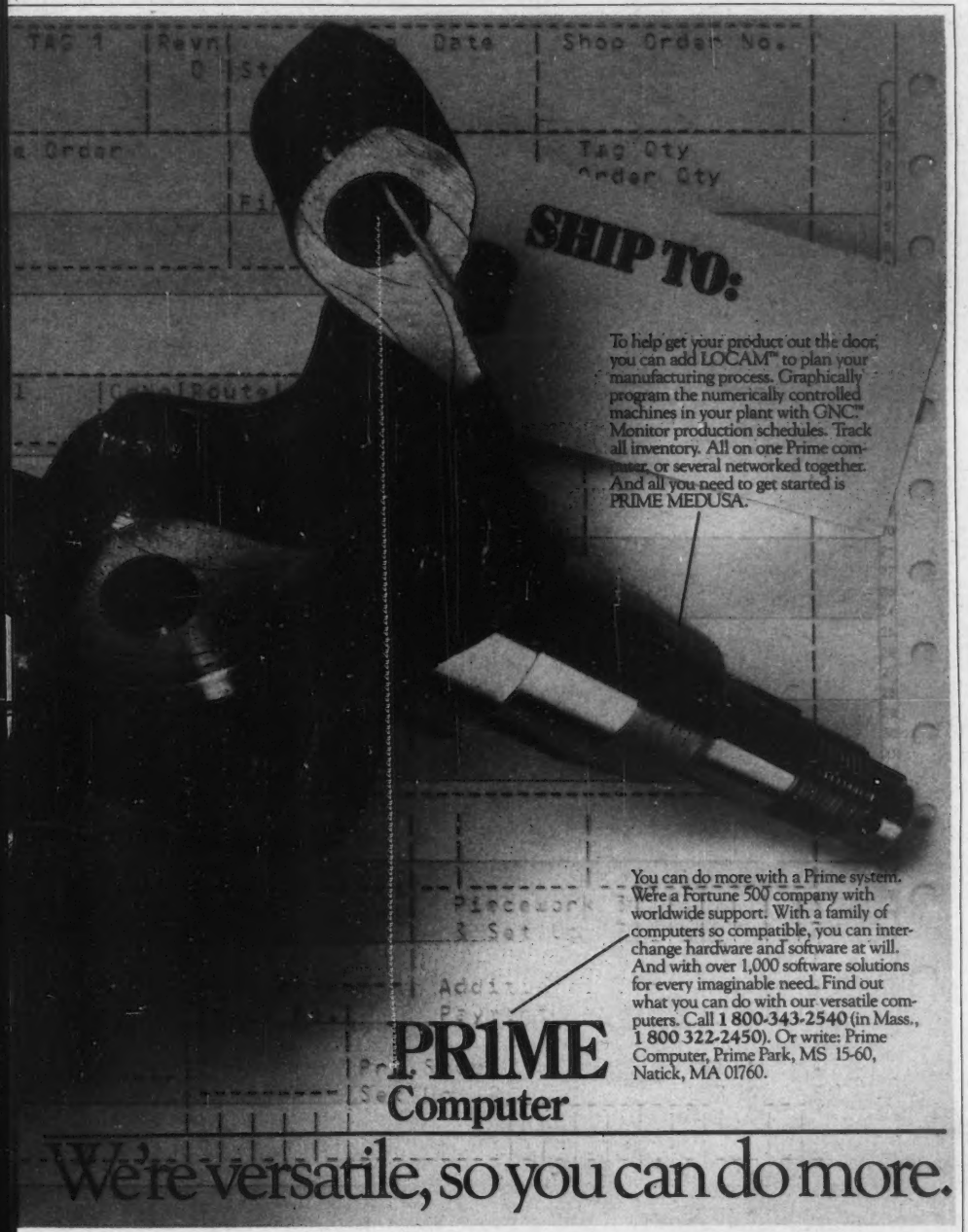
Asked if Opdendyk was asked to leave the company, Michele Niven, a Visicorp spokeswoman, said, "absolutely not." She said his departure was unrelated to the recent layoffs.

Neither Opdendyk nor Flystra returned phone calls from *Computerworld*.

Opdendyk did not reveal the nature of his new business venture. "He's not ready to announce it," Niven said.

In a recent interview, Opdendyk had told *Infoworld* magazine: "I have no plans to leave the company."

Opdendyk came to his job at Visicorp in 1980 from Intel Corp., where he had held a variety of management positions. From 1970 to 1973, he worked for Hewlett-Packard Co.



EXECUTIVE CORNER

C. Allan Conover has been appointed president at Memorex Corp.'s Communications Group.

Richard Lussier has been named president, chief executive officer and a member of the board of directors at Verticom, Inc.

Allen L. Prestegard has been appointed president of the telecommunications business of the United Technologies Building Systems Co.

John H. Farrell has been appointed president of Telecom Canada.

C. Murray Francois has been appointed president at Compaq Telecommunications Corp. Other senior manager appointments are **Frank Betron**, vice-president, engineering; **Jack R. Sellers**, vice-president, manufacturing; and **Roger H. Hughes**, vice-president, finance and administration.

Mark Klein has been named vice-president of John Diebold & Associates division of the Diebold Group, Inc.

Paul F. McLaughlin has been named group vice-president and general manager of Perkin-Elmer Corp.'s plasma systems division.

IPL to lay off 30% of employees, following profit losses, delays

WALTHAM, Mass. — IPL Systems, Inc., following more than a year of financial losses and a lengthy delay in shipping a fault-tolerant, IBM-compatible system, recently reported it will lay off 30% of its work force.

IPL suffered a severe set back in 1983 [CW, Oct. 24] following six profitable years as a manufacturer of IBM 4300 series-compatible processors.

The company lost $4.2 million in 1983 and posted a further $2.7 million loss in the first quarter ended in March.

The work force reduction was made to bring operating expenses more in line with projected revenues, the company said.

Alan Price, director of human resources with IPL, said the company is now down to about 100 employees, with the cutbacks coming in all departments.

The company has reportedly sold and shipped three of the new 4480 processors, which were initially to be shipped last September, when engineers discovered problems with the parallel processors in the machines.

Price said those problems have been resolved, and the 4480 is now "the best processor we've ever made."

Intel, Cypress settle dispute over proprietary Intel circuit

SANTA CLARA, Calif. — Intel Corp. and Cypress Semiconductor Corp. recently announced the resolution of a dispute that arose between them following the publication of an article by Cypress employees in which they reportedly described a proprietary Intel input buffer circuit originally included in the design of a Cypress memory device.

Intel said the resolution avoids legal action, which was under consideration.

Cypress agreed to continue to refrain from using the circuit or an equivalent for two years and further agreed to pay an undisclosed sum to Intel for publication of the design.

The dispute arose from the publication April 5 of an article written by four Cypress employees, one of whom was the former head of the design team at Intel that created the Intel circuit.

The input buffer circuit, according to spokesmen for the two companies, had been electrically disconnected from the Cypress memory circuit before the publication of the article and had never been electrically connected on shipped samples. The disputed circuit will be totally removed from future Cypress mask sets, the companies said.

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DEC to provide college grants

MARLBORO, Mass. — Digital Equipment Corp. has announced a research program that will provide $45 million in grants to colleges and universities for increasing the use of computer technology in education.

Called the Special Investment Grant Program for Instructional Productivity , the program is "designed to encourage the investigation and development of methods to increase instructional productivity in higher education," according to DEC.

Through the program, DEC will help colleges and universities obtain hardware and software for developing educational software and courseware. Institutes receiving grants will be asked to make the results of their projects available to the academic community "at a reasonable cost," the company said.

The grants will be distributed during the next three years to qualified schools. More information is available from Special Investment Grant Program for Instructional Productivity, Program Manager, DEC, Two Iron Way, MRO3-2/E7, Marlboro, Mass. 01752.

SUPERSHORTS

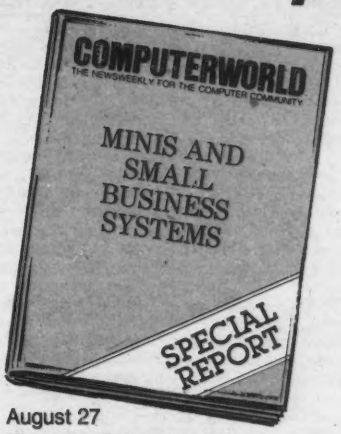
The Computer Museum announced that it is kicking off a $10 million dollar international capital campaign to purchase its new quarters at Museum Wharf in Boston, to underwrite new exhibits and to establish an endowment. Corporate supporters include Digital Equipment Corp., IBM, Data General Corp., Fujitsu Ltd., Intel Corp. and Xerox Corp.

■

Data General Corp. announced that the Department of Defense has validated the company's Ada compiler for the second consecutive year.

To ensure conformity with its Ada specifications, the Defense Department requires annual validation for all Ada compilers. Last June 14, DG became the first computer vendor to receive validation and is now the first to receive a second validation.

If you're not in *Computerworld's* next five special reports, look at the issues you'll miss

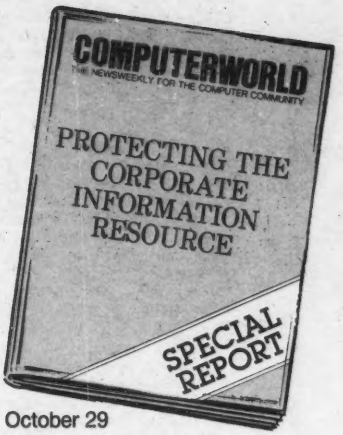


August 27

Minis and small business systems
We'll take a close look at the growing number of applications available. Plus we'll include reports from users on the problems they've had in selecting and implementing these systems, and how they solved them. Also, we'll offer vendors' suggestions on how to increase the efficiency and cost-effectiveness of minis and small business systems.
Closes August 10

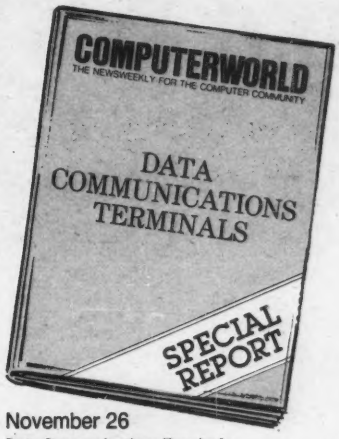
September 24

Data Base Management Systems
A comprehensive report geared toward a realistic understanding of DBMS. We'll include articles from users and industry experts on how to evaluate, select, implement, and trouble-shoot DBMS. And we'll update readers on recent developments, as well as offer users' solutions to common and not-so-common DBMS problems.
Closes September 7



October 29

Protecting the Corporate Information Resource
We'll discuss how to protect hardware & software resources, people resources, and physical plants. There'll be articles on: uninterruptible power supplies, data security monitors, data encryption software, disaster recovery centers (offsite data storage), fault-tolerant processing, data transmission security, protecting the computer room, and contingency planning.
Closes October 12



November 26

Data Communications Terminals
Users and vendors will comment on how terminals are making computers more responsive to organizational needs. Topics include: how to get the most out of dumb terminals; an update on smart and intelligent terminals; and guidelines for determining terminal's needs and selecting the equipment to meet them.
Closes November 9

December 31 & January 7

'85 Forecast
Our annual review and forecast issue. We'll examine some of the major events of 1984, and explore what lies ahead in 1985.
Closes December 14

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Adapso tackles software piracy

ATLANTA — A standing committee of the Association of Data Processing Service Organizations, Inc. (Adapso) recently announced a program aimed at reducing illegal copying of computer software.

Adapso's Software Protection Fund committee is collecting contributions that will be used primarily for educational purposes, including a public relations campaign about software piracy issues. Initial contributions totaling $200,000 have been made by Adapso members.

More information is available from Adapso, 1300 N. 17th St., Arlington, Va. 22209.

NCC from page 73

While Osborne accepts little blame for his organization's woes and seems headed for litigation with an explosive theory on just who did cause those woes, the book is a revealing insight into the perils of catching the high-technology tiger by the tail.

The tale is one of trying to manage stupendous growth when a company's engineering organization and business program lag behind production. Potential start-up founders could use this book as a lesson in what not to do.

Of course, if you cannot beg a review copy of the book, you just might hunt around to see if the entrepreneur-supreme himself is tucked into a busy corner somewhere hustling his new product.

PIRACY from page 73

The association calls the international piracy of software products a major financial problem. It estimates that piracy accounts for 1% of the worldwide software industry revenue, or more than $1 billion. Henriques said that $500 software packages in the U.S. are selling in the Far East for as little as $7.50.

Cbema and other associations are pressuring Congress for legislation addressing the piracy issue that would put pressure on foreign governments who do not recognize copyright protection.

In this vein, a bill recently introduced by Rep. Barney Frank (D-Mass.) would establish stiff fines for individuals and firms who traffic in pirated software products. The bill, H.R. 4646, is supported by Cbema.

FRANKLIN from page 73

Franklin was using in its Ace line of Apple-compatible microcomputers. Apple was awarded $2.5 million in a settlement last January. Franklin still owes two law firms $435,000 for work they did in the case, Gauff said.

'General softness'

Besides the Apple suit, Gauff cited two other factors in the company's decision. One was a "general softness in the personal computer business" which, she said, "contributed to enough of a decline in revenues that we couldn't meet our current obligations."

Another factor was the company's troubles in obtaining disk drives for its CX series, a line of transportable microcomputers compatible with Apple's Apple II and priced from $1,400 to $2,300. Gauff declined to identify the peripheral supplier, saying the company is still in negotiations with the firm. She added: "We think a large part of the problem is their responsibility."

Gauff said the problems with the disk drive supplier involved both availability and product quality. "We have subsequently found another supplier, and their product seems more suited to ours," she said, also declining to name that supplier.

Counting heavily on CX

"We're counting heavily on the new product and its success to contribute to our revival," Gauff said.

First shipments of the CX series, originally planned for June, are now expected to begin in late August or early September, according to the company.

Peter Teige, an industry analyst with Dataquest, Inc. in San Jose, Calif., said Franklin's sales have suffered since April, when Apple reduced prices on its Apple IIe computer. "I just don't think Franklin is in a position to be able to compete with that kind of pricing," he said. "Apple can produce IIes so cheaply, and they're selling so many of them right now. It kind of puts Franklin out of the picture."

The Apple price cuts "certainly have had an impact," Gauff conceded.

Teige said recent shake-ups in Franklin's top management have also hurt the company.

IBM from page 73

copies of the entire settlement agreement reached with Hitachi. Kuhn said IBM could not reveal details of the settlement beyond the official document filed in court last October because Hitachi had requested it remain confidential.

Kuhn said IBM's position was that the Justice Department's inquiry "was in response to erroneous, misleading and conflicting press speculation and reports on the settlement's terms." Furthermore, he said, "the Justice Department has made no charges or allegations, and IBM is confident that the department will conclude that there are no antitrust irregularities in the agreement."

Noting that the Justice Department had filed criminal charges against Hitachi and others that prompted the IBM suit, Kuhn said the department was consulted about the settlement prior to the filing of the consent agreement.

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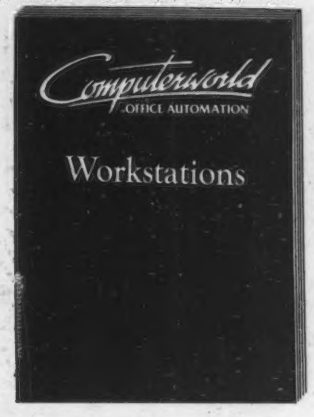
August

In this issue we'll look at microcomputer and word-processing software, using product reviews and case histories. Plus, we'll show readers how to decide which products meet their current and future needs.

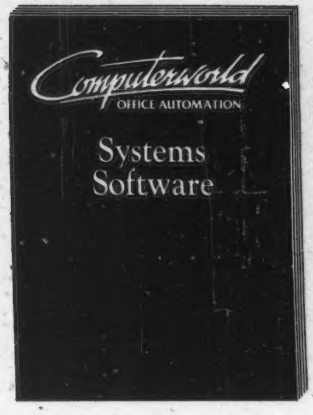
Closes: July 6



October

Readers will get the latest on integrated workstations and word processors. We'll make product comparisons, evaluate systems, and examine equipment capabilities. And we'll discuss hardware compatibility, hardware upgrades, and cost-justification ideas.

Closes: August 31



December

Coverage includes: user interfaces, natural languages, data bases, decision support systems, information centers, and artificial intelligence. Also, we'll highlight user solutions and vendor trends as we consider the current and future benefits of systems software.

Closes: October 26

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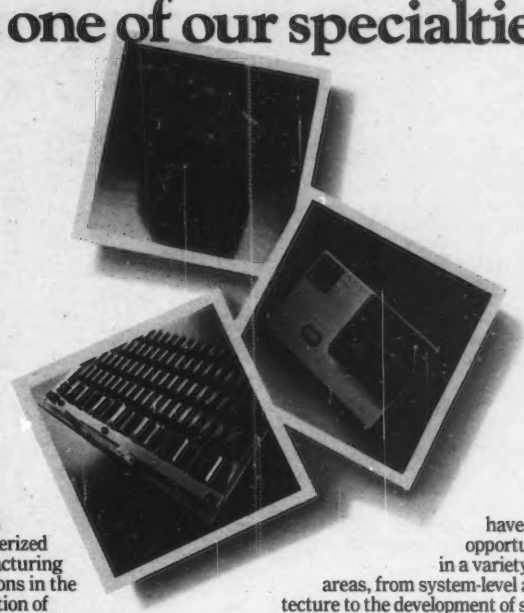

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The Associate Director of University Computing for Administrative Systems, reporting to the Director of University Computing, is broadly responsible for the development and oversight of university-wide administrative and management information system plans, policies, and priorities. Specific responsibilities include: administrative & management information system planning, policy, and priority development; administration and management of major university data base; oversight and review of administrative and management information system hardware and software acquisitions; and various administrative and management information system consultative services to administrative units at all levels within the University. Minimum requirements are a Masters degree in management information systems and data base administration and management, and a minimum of six years experience in progressively responsible planning, policy making, and administrative and management information system position or the equivalent combination of education and experience. Experience in higher education, experience in dealing with the problems and opportunities inherent in the administration and management of a complex University; familiarity with data processing and office automation equipment and commercially available administrative software; and the capability of communicating effectively and providing leadership in a comprehensive, decentralized educational environment preferred. Qualified applicants may be considered for academic tenure. Deadline for receipt of letter of application, including minimum acceptable salary, and resume is July 27, 1984, but may be extended if additional applicants are necessary. Send to: Lou Procter, Campus Employment Office, East Maxwell Street, University of Kentucky, Lexington, Kentucky 40506-0314.

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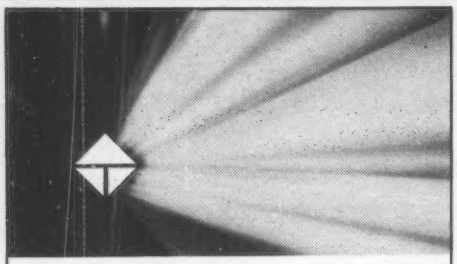

Programmer/ Analyst Business Applications

Triad Systems Corporation is a leading computer systems company which develops, manufactures, and sells on-line multi-terminal business computer systems that provide practical and effective solutions for the small independent entrepreneur within the automotive parts, hardware, tire and dental practice businesses. Products range from small microprocessor-oriented systems to large minicomputer systems. We have 153 marketing and support offices throughout the U.S., Canada, and England. We currently need top-notch business applications Programmers/Analysts.

Responsiblities will include the analysis, design, development and modification of computer programs for minicomputer turn-key systems utilizing COBOL. We will soon be converting to a UNIX System V environment and "C" programming language.

Requirements are to have a bachelor's degree in business with a major in management information systems, computer science, math or equivalent, and 2 OR MORE years of COBOL programming experience.

Salary will be commensurate with experience and includes an excellent benefits package. For immediate consideration, send your resume to Triad Systems Corporation, Division 1603, 1252 Orleans Drive, P.O. Box 61779, Sunnyvale, CA 94088-1779. We are an equal opportunity employer.

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As an ISC Installation Software Engineer, you will be responsible for the development and coding as well as customer interface throughout the installation of our customized financial applications software.

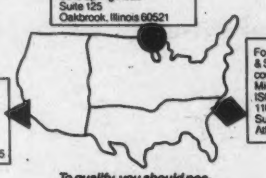
To qualify, you should possess Assembler Language programming experience and the ability to work with a system that incorporates a Z-80 microprocessor with a sophisticated multi-tasking operating system. Your experience in financial applications and data communications programming is also desirable.

ISC will expand your personal growth with a competitive salary and incentive bonuses, and flexibility in the hours you work. Send your resume and salary requirements to the ISC Regional office closest to you.

For information on Northern & Midwestern openings contact: Kathy Amerman, ISC Systems Corporation, 2015 Spring Road, Suite 125, Oakbrook, Illinois 60521

For information on Western openings contact: Jennifer Tippett, ISC Systems Corporation, 1040 Marsh Road, Suite 200, Menlo Park, California 94025

For information on Southern & Southwestern openings contact: Mike Robertson, ISC Systems Corporation, 1100 Circle 75 Parkway, Suite 300, Atlanta, Georgia 30339



ISC

EOE M/F

ELECTRICAL-COMPUTER ENGINEER

Conducts research and development activities concerned with microprocessor based instrumentation devises. Responsible for design, control software and all testing of microprocessor control systems. Knowledge of microcomputer systems and programming languages including: PASCAL, FORTRAN, BASIC and ASSEMBLY. BS in Electrical and Computer Engineering. Salary and bonus $24,750 per year commensurate with ability and experience. 5 days 40 hours per week. Respond with resume to: MGA Research Corp., 12790 Main Road, P.O. Box 71, Akron, NY 14001-0071.

KEY WEST

Director Of Data Processing

The Florida Keys Aqueduct Authority, a water utility, seeks an accomplished data processing generalist to manage, develop, and maintain its business and engineering applications systems. Position supervises small staff, acts as internal consultant, interfaces with DP related vendors and consultants and performs hardware/software evaluations. Good oral and written communications skills required. Must have 5+ years business DP experience, at least 2 years of which are supervisory, and bachelors degree in CS, accounting or technical discipline. HP3000 IMAGE/V3000/COBOL experience required. IBM PC, telecommunications, hardware, and public utility experience desired. Salary $30 to 40K. Send resume to:

Personnel Director, Florida Keys Aqueduct Authority, Box 1239, Key West, FL 33040.

DATA BASE ANALYST

Rapidly expanding IBM Data Center requires a data base support person with IBM 4341 PCS/ADS, DL/1 experience. BA in Computer Science or related field is desired. Competitive salary and benefits package. Ideal California location, between San Francisco and Lake Tahoe. Send resume to:

Julia Halladay, Employment Mgr.
Sutter Community Hospitals
3000 "L" Street, Suite 104
Sacramento, CA 95816
EOE M/F/H

FLORIDA SYSTEMS PROGRAMMERS

MVS, VM, TP

Large 3081/3033 installation seeking 2 experienced technical individuals; 1 in support of our TP installation, requiring strong ACF/VTAM, NCP/EP, SNA/SDLC knowledge and experience; another to help implement and support a VM/CMS environment. Salary range: $20,100 - $36,200. Anticipated starting: $27,000 - $32,000+ depending upon experience. Bachelors degree and 3 years experience or an equivalent combination required. Resume to: Associate Director, Central Florida Regional Data Center, University of South Florida, Tampa, FL 33620. Application deadline: 7/13/84. Affirmative Action/EOE.

SENIOR PROGRAMMER/ ANALYST

Airco Carbon, a rapidly growing carbon and graphite manufacturer located in St. Mary's, PA, has an immediate need for a Senior Programmer/Analyst.

We are seeking an aggressive talent, ready to offer a broad scope of skills. If you have 2-4 years experience in Data Processing and good communications skills, we need your expertise. BA/BS degree in business, management information systems, computer science, or related field is required.

The Senior Programmer/Analyst will be generating new and maintaining existing programs in COBOL and Assembler language. Skills and the use of CICS and DL/1 would be a plus.

You'll be given broad technical visibility and have access to the latest computer hardware and software. Salary commensurate with experience. Excellent benefit program with relocation assistance. Please forward resume in confidence to:

Human Resource Manager
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University of New Orleans
Director, Computer Research Center

The University of New Orleans, a public urban institution with an enrollment of over 16,000 students, invites applications and nominations for the position of Director, Computer Research Center. The Director reports directly to the Vice Chancellor for Academic Affairs and has administrative responsibility in planning, review and evaluation of all academic computing services and related technologies for the University of New Orleans. The Computer Research Center (CRC) serves the needs of researchers, students and teachers alike. The Director evaluates, recommends and directs the implementation of new and improved systems, software and hardware to meet the University's expanding computer needs.

The CRC currently utilizes a DECsystem 10 and a VAX 11/780. In addition, a VAX cluster with three VAX 11/785's and over 8 gigabytes of disk storage will be installed in July. Installation of an Ethernet local area network connecting the VAX cluster with every major building on campus is underway. Plans are in progress to connect over 150 Zenith Z-100 microcomputers directly to the network.

Qualifications must include: demonstrated interpersonal and administrative skills in a senior level management position; extensive working knowledge of computing and information systems; familiarity with educational environments and university operations; and a clear commitment to advanced computing in an academic setting. The salary is negotiable and will be commensurate with education and experience.

Nominations and applications, including current resume, should be postmarked by August 31, 1984 and forwarded to: Dr. Peter Sorant, Director Search Committee, Office of the Vice Chancellor for Academic Affairs, University of New Orleans, Lakefront, New Orleans, LA 70148.

The University of New Orleans is an Equal Opportunity/Affirmative Action Employer.

SENIOR SYSTEMS ANALYSTS
PROGRAMMER ANALYST

Two Senior Systems Analysts and one Programmer Analyst needed to assist in the design and implementation of a six project, 70 manyear system basic to the natural gas industry.

Senior Systems Analyst: The chosen applicants will be expected to perform as project leaders of design and implementation teams of up to 12 staff members. Must have over 5 years experience in designing and implementing IMS DB/DC systems using structured methodologies. Large project management experience preferred.

Programmer Analyst: Must be experienced in implementation & testing of on-line data base systems. Should be familiar with structured techniques, COBOL, JCL, TSO, and DLI. The chosen applicant will be assisting in subsystem design, writing detail program specifications, programming, testing & documenting. Good communication skills are a must.

General Requirements: Computer Science degree preferred, appropriate work experience may be substituted. Must have IBM IMS DB/DC experience.

Excellent benefit package, relocation to Clarksburg, WV required, salary commensurate with experience. Send resume to:

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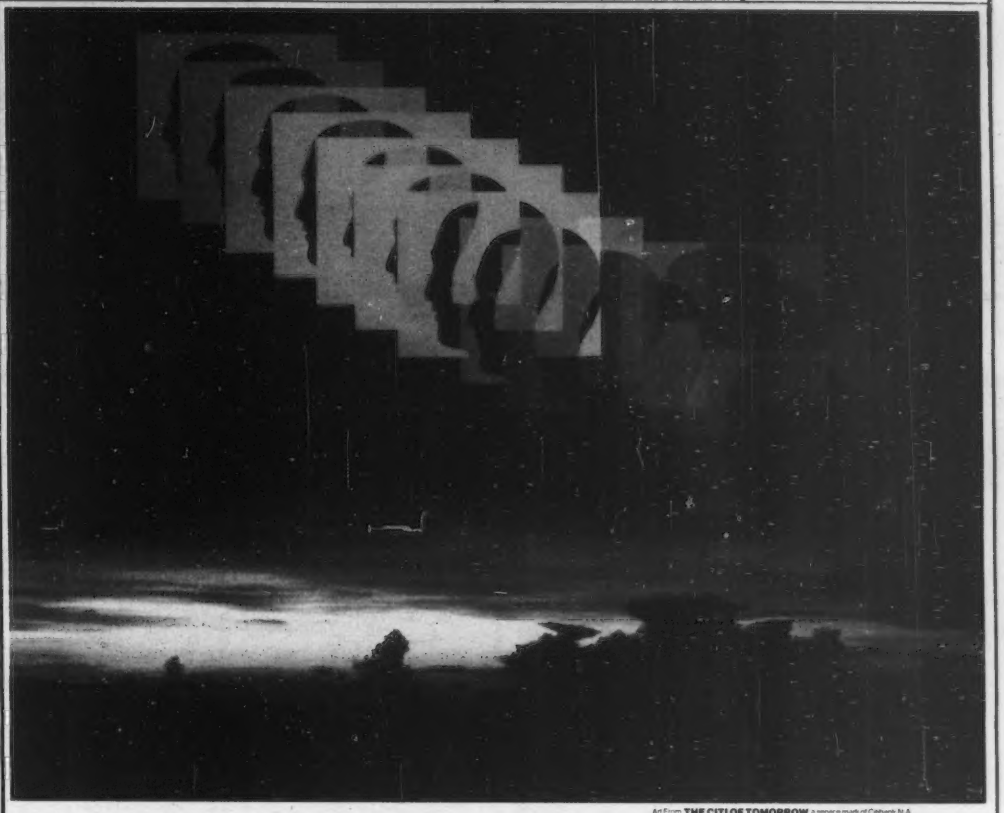

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Systems Analyst/ Software Specialist

Boston Based

Our client, a well established, growing company in the emerging field of biotechnology, has a challenging opportunity for an individual to assist in the design, development and support of software for a clinical microbiology laboratory system.

The successful candidate will possess a degree in Computer Science and/or Medical Technology coupled with a minimum of 2 years programming/systems experience. Background in the design of interactive environments is essential. Familiarity with microcomputer systems, UNIX, PASCAL and "C" is desired.

Individuals interested in pursuing a career within a stimulating professional environment, should forward a detailed resume with salary history, in confidence, to: **GTA 1290, c/o GT Recruitment Advertising, Inc., 1621 Euclid Avenue, Suite 516, Cleveland, Ohio 44115.** An equal opportunity employer m/f.

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Call or send resume to:

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Requirements include:
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The qualified Programmers will receive remuneration commensurate with experience and full range of company paid benefits. If you are challenged by hard work and creativity, forward your resume with salary history to:

Mary Stewart

MEDICUS SYSTEMS

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COMPUTER OPENINGS

Sverdrup Technology, Inc. LeRC Division is entering a long-term staffing mode. We have secured a 30-million dollar contract with the NASA Lewis Research Center, Cleveland, Ohio, and are building a division of Research Professionals to provide scientific, engineering and technical support for exciting PROPULSION, ENERGY, and SPACE programs.

Located in Middleburg Hts., Ohio, a pleasant small town suburb of Cleveland, we offer a low cost of living and a high quality of life. We are minutes away from Lake Erie and water sports and are surrounded by the famous Emerald Necklace Natural Park System, as well as offering easy access to various ski areas. Apart from the enjoyment of all FOUR seasons, we offer the renowned Cedar Point Amusement Center on our Western doorstep plus an abundance of cultural events.

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College degree plus 1-6 years experience. Knowledgeable in state-of-the-art IBM technology. Experience in MVS/XA, TSO or VM. Solid background in MVS installation management: performance/tuning, SMF and RMF data analysis, hardware/software configuration, system dump analysis, capacity planning, hardware reliability, local area network.

PROGRAMMER(S), DATA BASE SPECIALIST

College degree plus 1-3 years experience in coding and debugging ADABAS/NATURAL programs.

PROGRAMMER ANALYST(S), DATA BASE SPECIALIST

College degree plus minimum 2 years experience on IBM mainframe. Proficient in ADABAS/NATURAL, analysis and design experience.

TECHNICAL WRITER

Computer Science degree required plus 3-6 years experience in EDP environment. Will document and write systems specifications and design documents and reports.

HYBRID COMPUTER ENGINEER/PROGRAMMER

BSEE degree with 5 years experience in program debugging and operation of hybrid computers. Experience with EAI equipment. Experience in hybrid simulation of airbreathing propulsion systems and controls.

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Sverdrup Sverdrup Technology, Inc.

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Minneapolis, MN 55402
(612) 339-9001

SYSTEMS ANALYST/PROGRAMMER - Develops & designs application programs & support doc. Plans & directs system testing, implements modifications. Designs & develops data file & operating system JCL. Provides tech. asst. to data personnel. Works with IBM 4341 & VM/CM's. 2 yr. diploma (Analyst Programmer), 4 yrs. exp. 40 hr. wk. $34,500 per yr. Job site: Newbury Park. Send resume to Data Center, P.O. Box 3669, Thousand Oaks, CA 91360.

SYSTEMS ANALYST

Rapidly expanding, multi-state wholesale distributor of builder, commercial and industrial products have bonus - level opportunity in Headquarters computer group. Need 3+ years of BASIC programming experience on PICK operating system or Advanced BASIC and PASCAL plus managing Honeywell DPS-6 equipment. Industry experience a plus. Some travel.

If interested in the attractive environment of Eastern Virginia, salary, benefits, and dynamic work place we offer, send your resume - with salary history - in confidence to:

Director - Personnel
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APPLICATIONS PROGRAMMER/ANALYST

As in Applications Programmer/Analyst, working under supervision, analyze scientific systems specifications and develop programs using Numerical Method, Statistics, Probability, and Finite Element Techniques. Requires use of Assembly Language (PDP-11). Responsibility will encompass maintenance of software system. Requires Master's Degree in Computer Science. Education should include at least two courses in both Numerical Analysis and Assembly Language as well as one course in Finite Element Methods. Salary offer $24,000 a year, 40 hours a week, 9 to 5 Monday thru Friday. Send resume to Constance Leahy, Personnel Representative, Northwestern University, 339 East Chicago Avenue, Chicago, IL 60611.

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SANTA FE

VM SYSTEMS PROGRAMMER

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The State of New Mexico's central computer installation, located in Santa Fe, is recruiting a **VM systems programmer** to support its rapidly expanding IBM 3081D and 3033 environment. Housed in a state-of-the-art facility constructed especially for data processing, the center provides services to agencies of state and local government over a statewide network.

APPLICANTS should possess an indepth knowledge of VM/CMS utilizing VCNA and VRNA as well as extensive experience with VM EXECS. Experience with PROFS, SAS, RAMIS, and other VM software will be beneficial.

A benefit package including optional 4 day work weeks, flex time, and 3 weeks vacation is offered, together with the opportunity to work with the most advanced state-of-the-art technology.

For **IMMEDIATE** and **CONFIDENTIAL** consideration, please submit your resume with salary requirements to:

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Information Systems Division,
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Submit resume, Location preference, Present salary to P. Darrah

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SYSTEM 38 PROGRAMMER/ANALYST

Peppermill, Inc., a multi-location company in Reno, Nevada, with activities in the restaurant, hotel, and gaming areas, is seeking an experienced Programmer/Analyst. The successful candidate will have a minimum of 5 years data processing experience and at least 1 year of RPG III programming. In addition, the candidate should also have good analytical skills so that they may work well in an independent environment. Experience in the restaurant, hotel, and/or gaming industry will be a definite plus. We offer an excellent starting salary and a full range of company benefits, including profit sharing. Qualified candidates should submit their resume, including salary requirements to:

Dick Eimer
Manager, Information Services
Peppermill, Inc.
2707 South Virginia
Reno, NV 89502

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The ABILITY SEARCH GROUP
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S/38 MGR

Rapidly growing regional retailer seeks Data Processing Manager. Must have line management experience, know RPG III, and be a team player! $43K.

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(301) 652-1550

PROGRAMMER/ANALYSTS

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We are seeking a senior level systems programmer to take charge of the planning, installation and support of MVS, CICS, VTAM and related products. You should have a minimum of three years experience in a MVS/VTAM or VM/VTAM environment and involvement in one or more of the following areas will be a significant plus:

- Performance Measurement and Capacity Planning
- CICS Tuning
- ADABAS
- Telecommunications
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Salary $35,000. Send resume to 52 Chamber Street, Room 115D, New York, NY 10007. EOE M/F/H.

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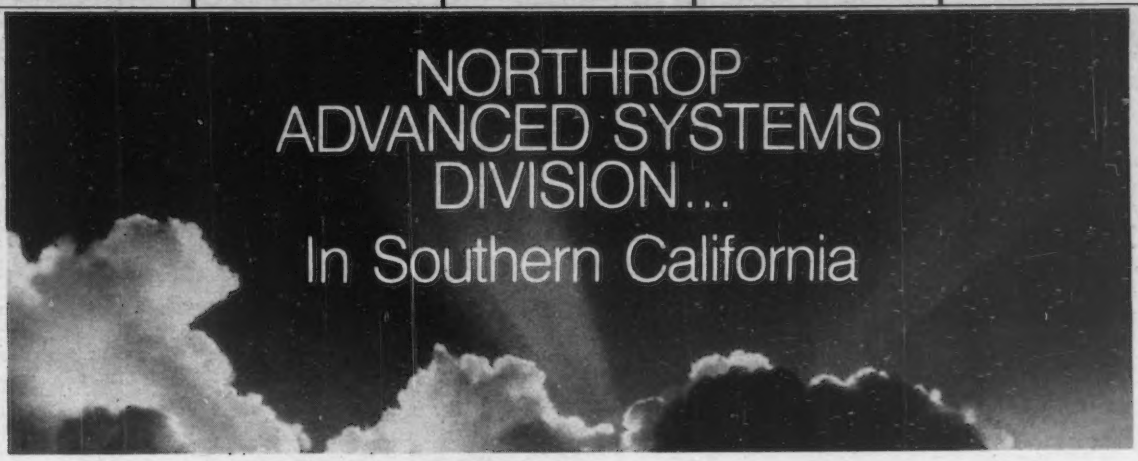

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To define the future of flight takes a unique team of specialists. It also takes a successful pattern of growth, a willingness to be innovative in approaches to management, technology and manufacturing. This is the most exciting time in aerospace history, our sound financial condition allows us to build state-of-the-art plants, resulting in high productivity and advanced manufacturing capabilities. At **Northrop Advanced Systems Division** in Pico Rivera, you'll find a proud past, an exciting present and a future alive with challenge.

Here in our newest facility, a highly skilled team of professionals are involved in a wide range of challenging Research and Development projects such as the initial R&D of advanced bomber concepts for the U.S. Air Force.

Northrop Advanced Systems Division is ideally located in the heart of Southern California, mid-way between Los Angeles and Orange County in Pico Rivera. Our location is to your advantage in terms of an ideal year-round climate, a wealth of recreational, cultural and educational pursuits, and a wide diversity of lifestyles from which to choose.

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Data Processing professionals are needed to work with state-of-the-art computer systems, including automated factory systems. As part of our programmer/analyst team you will analyze and develop system design solutions to Manufacturing, Engineering, and Financial business application problems. You will interact with both data processing and user personnel while working with the latest IBM hardware, implementing these systems within an integrated data base architecture. IMS with emphasis on DB/DC, COBOL and related software is required experience for these opportunities. DYL 280, MARK V and any fourth generation languages that you have experience with is desirable.

IMS Systems Programmers

Our IMS systems programmers are actively furthering their careers in the development design, and use of the IMS on-line system. If you're interested in joining our progressive team in troubleshooting and running an IBM (DB/DC) system in a dynamic environment, then we're interested in talking to you. Knowledge of IMS (DB/DC) installation and maintenance techniques is required.

Capacity Planners

Performance and tuning systems programmers with experience in tuning IO configurations job mix with heavy MVS. Familiarity with reporting techniques, graphical representation and SAS, as well as performance experience with Omegamon, SMF and RMF is required.

Data Processing Equipment Configuration Specialists

Responsibilities will include equipment evaluation, acquisition recommendations, configuration design, installation planning for all types of central site IBM data processing equipment. Additionally will be responsible for site facilities planning and equipment and facilities inventory tracking.

Network Design Specialists

Immediate openings for an individual having leadership skills who will direct the activities of a team of highly skilled communications analysts in designing and maintaining network architectures in a local and remote environment. The candidates background will include ANYNC, DISYNC and SNA/SDLC protocol, local area topology and a good understanding of common carrier facilities. Satellite communications experience is desirable. An advanced degree is preferred.

Sr. Communications Analyst

Immediate opening for a Communications Analyst with at least 5 years of experience in designing and installing network architectures in a local and remote environment. Individual will have demonstrated experience with local topologies, common carrier links (terrestrial and satellite). ASNYC, BISYNC, and SNA/SDLC protocols, IBM communications and cluster controllers, multiplexing, cross domain and minicomputer networking (peer style or interconnection). A BS degree is preferred.

Data Base Designers

Experience in the design, development and maintenance of large-scale business and scientific applications, an in-depth understanding of IMS DB/DC and fundamental cost/performance trade-offs between various physical organizations possible, a sound working knowledge of structured system analysis and design methodology as well as data flow diagrams, logical data analysis and modeling is required.

(Contact: **Dave Coffey**)

Data Base Analysts

Experience in data base administration, IMS DB/DC data base design, analysis and support of large-scale applications such as Logistics, Material, Manufacturing and Engineering is required, as is a working knowledge of TSO/SPF, IBM data base utilities and command language (CLIST) processing and procedure development/documentation. A sound working knowledge of structured systems analysis and design methodology as well as file access methods, data security and control, data analysis/normalization, data modeling and performance tuning is desirable.

Software Quality Assurance

Computer Systems professionals with experience in project management and excellent interpersonal skills are needed to work on our software QA staff. Qualified individuals should have experience in the conducting of life cycle phase reviews, evaluation of software products and the development of internal computer systems standards. A BS and significant project management experience including the above-mentioned responsibilities is required.

(Contact: **Dave Coffey**)

Avionics Software Engineers

Will design and code application software for real time microprocessor based systems. Minimum of 4 years experience in real time design and code with assembly language and HOL, preferably JOVIAL.

Will evaluate the overall design of executive routines for real time airborne microprocessor based systems. Participates in the evaluation to determine adequacy and correctness. Minimum of 4 years experience in software architecture design.

Will test and analyze the design and implementation of real time software, including both executive routines and application code. Minimum of 6 years experience in software verification and validation.

Will develop and analyze the ground test software/firmware to support the testing of real time airborne systems. Must be capable of utilizing microprocessor development stations in the development of high speed microprocessor control networks. Minimum of 3 years experience.

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Requires an experienced VAX 11/780 system programmer to develop a computer system for high technology in real and non-real-time applications. This senior level position requires 5 years experience in DEC software processors and a BS in Computer Science or Electrical Engineering.

(Contact: **Bob Bushley/Rich Lee**)

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- MVS/JES3
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A BS or MS in computer science with technical/scientific concentrations is required, and proficiency in assembly language for one of the listed areas is required.

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- Graphics system development and support addressing both high-speed interactive and electrostatic devices
- Development and support of Data Base Management Systems and Data Dictionaries with emphasis on both hierarchical and relational structures

Interested? Please send your résumé citing the name of this publication to Mr. Laddie Macha, Shell Oil Company, P.O. Box 2463, Houston, Texas 77001. U.S. Citizenship or immigrant visa required.

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BA/BS required with 6-10 yrs. exp. in business applications. Has designed large database management systems in large-scale IBM mainframe environment. Has in-depth experience with a database management system (IDMS or ADABAS or IMS). Understands fundamental cost/performance tradeoffs between various physical organizations possibly in database management systems. Has a sound working understanding of Structured Analysis Design and Design Tools including Data Flow Diagrams, logical data analysis, logic tools, transform and transaction analysis, data normalization and entity relationships.

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The Corporate Contingency Planning Administrator will serve as internal consultant in the development and implementation of security contingency plans.

The successful candidate will have a background in security with a minimum of 2 years experience in data processing operations, and must have been involved in the design and/or implementation of a security contingency plan.

Send resume to the attention of:

Lisa Samo
Recruiter
Fidelity Investments
161 Devonshire Street
Boston, MA 02110

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- CICS/VS Command Level
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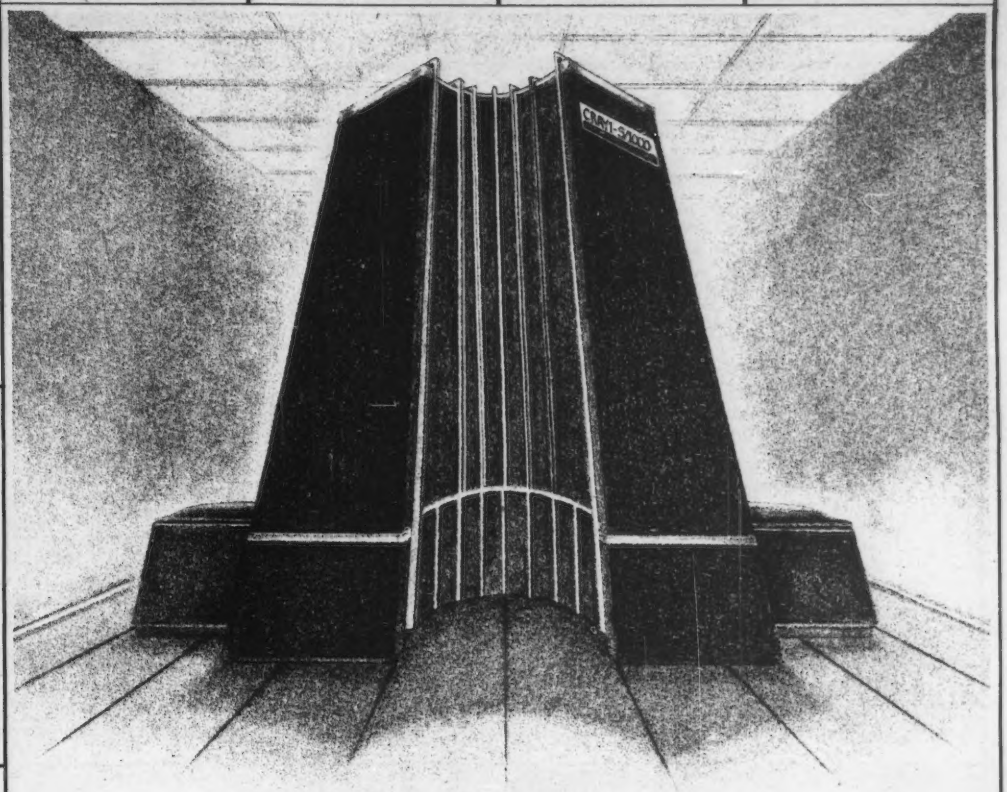

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You'll need significant technical/management experience in on-line banking/electronic delivery systems with emphasis on plastic-card, ATM and POS transactions. Electronic banking product knowledge and excellent oral and written communication skills are necessary. Travel is required.

We offer competitive salaries, a unique benefits package which includes flextime and a stimulating professional environment which encourages growth and advancement. Please send your resume with salary history to: **Charlotte Moffett, Electronic Banking Center, First Interstate Services Company, Job #1077, P.O. Box 935, El Segundo, CA 90245.** Equal Opportunity Employer.

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Qualified candidates are required to have 5 or more years experience with VTAM, NCP installation, maintenance and debugging in an MVS environment, and an in-depth knowledge of SNA, MSNF networking and associated hardware (IBM 3705 and 3725). Previous experience with VTAM applications and other network products (SNI and NPSI) is highly preferred.

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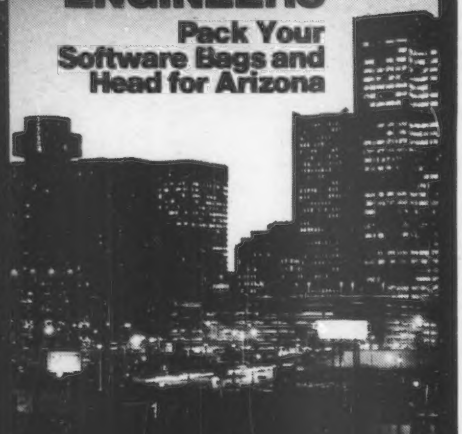

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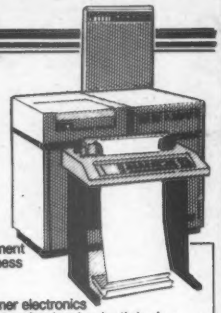

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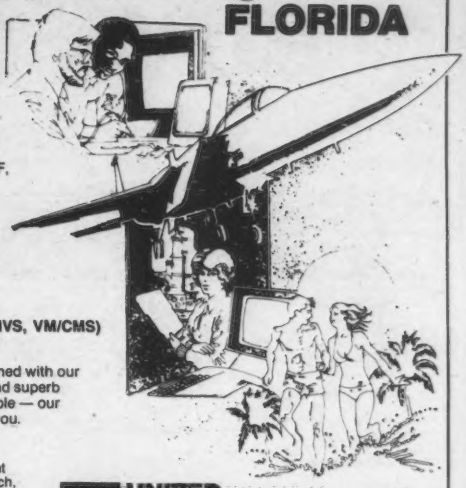

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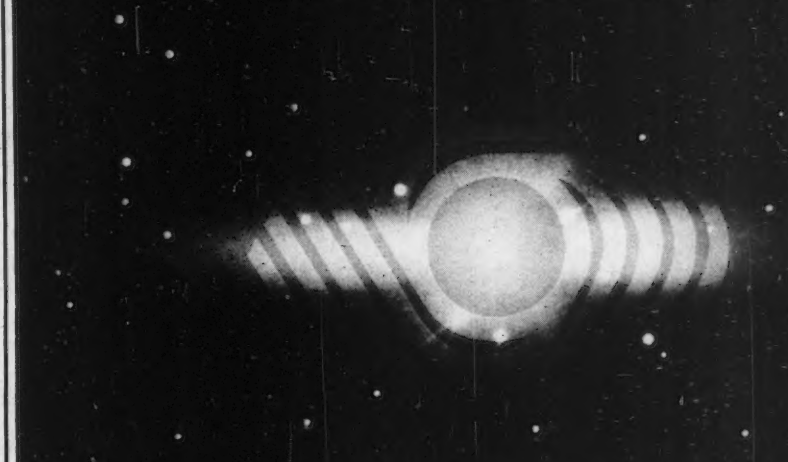

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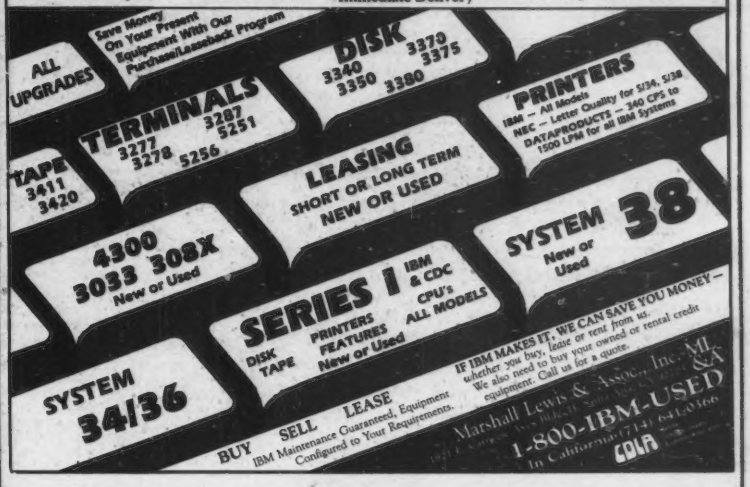

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The bid opening will take place in the Town Hall Conference Room #309 immediately thereafter.

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The deadline for classified advertising is ten days prior to the issue desired. (That's six working days prior to the issue date). Ads may be sent in by mail. For camera-ready ads, a velox or negative is required. For ads to be typeset by us, enclose a layout if needed, along with any logos or artwork you would like to include in the ad. These must be dark and clear for reproduction purposes.

Our ad takers will be happy to take smaller sized ads over the phone. We can provide simple line borders for you, if desired.

We also provide telecopier service at extensions 410 and 451.

The open line rate is $9.15 per line and there is a minimum size ad of 2 column inches (28 lines) at a cost of $256.20. Column inches are calculated by multiplying the number of columns wide by the number of inches deep that your ad is. Depth increases in half-inch increments and we accomodate up to 5 columns. Column widths are as follows:

1 column -- 1 13/16" or 11 picas
2 columns -- 3 13/16" or 23 picas
3 columns -- 5 13/16" or 35 picas
4 columns -- 7 13/16" or 47 picas
5 columns -- 9 13/16" or 59 picas

If you wish a box number to be assigned to your ad, it will cost an additional $15.00.

First-time advertisers must send either payment or a purchase order along with their ad.

For the ***Computerworld Bulletin Board***, ads may be sent by mail, by telecopier or given over the phone. Space is available in ***one column by one inch deep units*** only. They are set up using a ***simple format with standard typefaces and no borders or logos are allowed.*** The cost of one standard unit is $130.00. These units may be combined to form deeper ads.

So, whatever the problem, simply supply us with the data we need to help you on your way to a solution, quickly and efficiently.

If you wish to reserve space, or would like more information, call us at 1-800-343-6474 or (in Mass.) 617-879-0700. All materials should be sent to:

COMPUTERWORLD Classifieds
Box 880, Framingham, MA 01701

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

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SPREADSHEET SOFTWARE
IDPS/IMOS $550 IRX, ITX $650 VRX $1950
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MANY USED DEVICES 50% TO 80% OFF LIST PRICE
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WE BUY YOUR USED LEVEL 6 AND DPS 6 SYSTEMS AT TOP $$$.

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VIP7801	$1,900
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$77,900
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Burroughs Buy-Sell-Lease

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Desktop Generation
10, 20, 30 Immediate Delivery
Systems, Software, Service
Copley Management
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6214 602 MB Winchester S/S	$26,800
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6067 or 6067H 50 MB S/S	$6500
6100 25 MB w/126 S/S	$4100
6103 25 MB S/S	$3500
6099 12.5 MB S/S	$1950
6060 20 MB S/S	$2900
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6030-A Dual Floppy Ad On	$550

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Most any configuration upgradeable to Series 68
SAVE AT LEAST $50,000
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Processors • Peripherals • Parts
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Call Carol
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2 ADCC	1 7976A
30 2622A Direct Connect	
2 2608s	

System Is Under Maintenance Contract
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Peripherals also available:
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1st SOLUTIONS
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ASK FOR DON OR MATT

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BDV11-AA	$395
DR780-AA	$7,500
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DZ32-A	$2,175
DZ32-B	$1,870
FP11A	$1,185
KK11-A	$1,785
KK11-B	$2,475
MS11-MB	$1,075
MS780-CE	$14,500
MS780-DC	$3,100
MSV11-LK	$875
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RLV11	$775
VAX 1MB MS730-CA	$2,850
VAX 1MB MS750-CA	$2,850

Call Ray at QEI, Inc.
(617) 275-6800

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PDP11/45	H744	RH11
11/70 parts	H745	RH780
DB11-A	H754	RK11D
DD11-CF	KE44-A	RKV11D
DD11-DK	KK11-A	RL01-A
DL11-E	KT11-C	RM05-C
DL11-W	KT11-D	RP04 parts
DMC11-DB	KY11-LB	RP06 parts
DMC11-DA	LA36-CE	RP06-C
DMC11-MD	LA37-CE	TA11-AA
DZ11-C	LAX34-CL	TMB11 cntl
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RA81	Call
11/73	Call
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Digital Computer Resale
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LA120-DA	RM03-C	VT1XX-AC	
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11/24	$5,200
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Micro PDP-11 w/Winchester Floppy
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3279
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1 IBM System 34, 256K, 192 Meg Disk, Comm Feature. For more information call Mike Mintzer, (206) 789-1500.

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Any Model or Configuration
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Available Within 30 Days
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(1) 9391 Disk Extension
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What is The Bulletin Board?

It's a classified section in Computerworld designed especially for the selling and buying of individual pieces of hardware in a convenient, low-cost format. It is especially suited to companies that have a piece of used equipment they want to sell. For one low price, you can inform more than half a million Computerworld readers around the country of your equipment's availability.

How Does The Bulletin Board Work?

Bulletin Board ads come in standard units (one column wide by one inch deep) and standard typefaces. (Units may be combined to produce deeper ads, but one column is the maximum width and no units of less than one inch are available.) Ads are arranged under headings (such as "IBM", "DEC" or "Printers"). The headline of the ad is set in larger, bold type, and should contain the standard equipment identification. The body copy should describe the equipment very briefly and give the person to contact. This is all the information an interested buyer needs to follow up. No ad should have more than one piece of equipment or software.

The price for each standard unit is only $130.00. There is a one unit minimum and no fractional units available.) Anyone can place an ad, but no agency commissions are paid, no quantity discounts allowed, and no credit toward rate is given for contract advertisers who advertise in other sections of Computerworld. It's a simple and effective system for buying and selling hardware and software.

How to Place an Ad in the Bulletin Board.

Ads are accepted in the mail, by phone or by telecopier. Ads can be accepted up until the Monday before issue (7 days in advance of issue date). You should write out your ad before submitting it. (The standard size will hold approximately 25 words of copy.)

Once you've written your ad, send it in with the coupon or call one of our ad-takers. (If your company has never advertised with us before we request a check with your order.)

Remember that all ads are standard. No special typefaces, no borders and no logos are allowed. Ads are set on a six-column page in our classifed section under the heading "The Bulletin Board.". We assume no liability for errors beyond the price of the ad in the case of material errors.

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Issue Date: Ads can be accepted up until the Monday preceding the issue desired. **Computerworld** comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commisions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Issue Date(s):_____
Signature:_____
Name:_____
Title:_____
Company:_____
Address:_____
Telephone:_____

Send this form to:
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375 Cochituate Road, Box 880,
Framingham, MA 01701
617-879-0700 **800-343-6474**

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303/773-3732

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For IBM Systems 34/36
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$250 Each
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- Regression equations for up to ten independent variables calculated in minutes.
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- Easy to use with an elementary understanding of mathematics.

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For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

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J.D. Edwards & Company

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Bakersfield, CA — 805/ 327 1911
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Framingham, MA 01701

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4341-2 370/158-3

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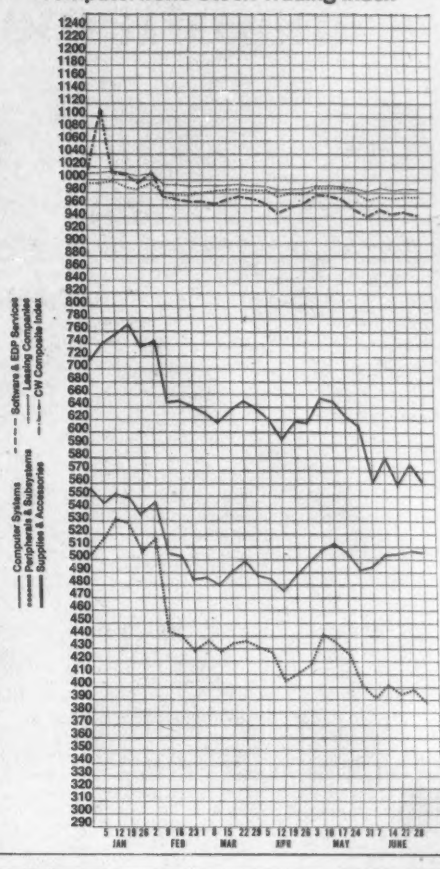

Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, JUNE 27, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E		1983-84 PRICE RANGE (1)	CLOSE JUN 27 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	11- 24	10 1/2	-1 1/2	-12.5
O	ALTOS COMPUTER SYST	8- 21	10 1/2	- 1/4	-2.3
A	ANDANL CORP	11- 30	11 1/8	0	0.0
O	APPLE COMPUTER INC	18- 63	25 1/4	-5	-18.5
N	AT&T	15- 21	16 3/8	- 3/4	-4.3
N	BURROUGHS CORP	44- 56	52 1/2	+ 5/8	+1.2
O	COMPUTER AUTOMATION	8- 17	5 3/8	- 1/4	-4.2
A	COMPUTER CONSOLES	14- 26	17 1/2	- 3/4	-4.4
N	CONTROL DATA CORP	28- 62	31 1/4	-1	-3.1
O	CONVERGENT TECHNOL	12- 41	12 7/8	- 1/8	-0.9
N	CRAY RESEARCH INC	38- 94	86 3/4	+1 3/4	+2.0
N	DATA GENERAL CORP	27- 45	40	-2 1/4	-4.8
N	DATAPOINT CORP	18- 31	19 7/8	-1	-4.7
N	DIGITAL EQUIPMENT	84-125	86 3/4	-1 3/8	-0.7
A	EECO INC	12- 18	14 1/8	0	0.0
N	ELECTRONIC ASSOC.	3- 15	5	- 5/8	-11.1
N	FLOATING POINT SYST	13- 44	18 5/8	- 1/8	-0.7
N	FOXBORO	28- 47	29 3/4	+ 7/8	+3.0
O	GENERAL AUTOMATION	5- 16	9 1/4	- 1/4	-2.6
N	GOULD INC	24- 44	28 1/4	-1 1/8	-4.1
N	HARRIS CORP	26- 48	28 1/8	+ 3/8	+1.4
N	HEWLETT-PACKARD CO	31- 48	36 7/8	- 1/8	-0.3
N	HONEYWELL INC	48- 69	51 3/4	-2 1/8	-3.9
N	IBM	103-134	103 1/8	-5	-4.6
O	IPL SYSTEMS INC	3- 14	2 1/2	- 1/2	-16.6
N	M/A-COM INC	13- 35	18	-1 1/4	-6.4
N	MANAGEMENT ASSIST	8- 28	25 3/4	+2	+8.4
N	MATSUSHITA ELEC(ADR)	60- 88	68 1/4	-2 3/4	-3.9
N	MODULAR COMPUTER SYS	5- 16	7 5/8	+ 5/8	+8.9
N	MOHAWK DATA SCI	8- 17	11 5/8	+1 3/8	+13.6
N	MOTOROLA INC	28- 48	31 5/8	-1 1/2	-4.5
N	NAT'L SEMICONDUCTOR	11- 20	14 3/8	- 5/8	-4.2
N	NBI INC	17- 36	21 1/8	- 7/8	-3.9
N	NCR	24- 34	23 3/4	- 3/4	-3.0
N	PERKIN-ELMER	18- 32	20 1/2	-1 3/8	-6.2
N	PRIME COMPUTER INC	11- 26	13 1/8	+ 1/2	+3.9
N	SPERRY CORP	36- 56	37 1/8	-2 1/2	-6.3
O	TANDEM COMPUTERS INC	18- 40	22 1/8	-1 3/4	-7.3
N	TANDY CORP	25- 62	25 1/4	-3 1/2	-12.1
O	TELEVIDEO SYSTEMS	8- 41	5 3/4	- 1/2	-8.0
O	TELKON CORP	9- 18	11	+ 3/8	+3.5
N	TEXAS INSTRUMENTS	101-168	109 1/8	+ 5/8	+0.6
A	ULTIMATE CORP	15- 24	19 1/4	- 5/8	-3.1
O	VECTOR GRAPHICS INC	1- 9	3/4	0	0.0
A	WANG LABS "B"	24- 42	28	+1	+3.7
A	WANG LABS "C"	24- 42	28	+1 1/8	+4.1
N	XEROX CORP	35- 52	38 5/8	-1 1/8	-2.8

LEASING COMPANIES

O	BOOTHE FINANCIAL CP	10- 21	20 3/4	+1 1/2	+7.7
N	COMDISCO INC	10- 192	13 1/2	- 1/8	-0.9
O	CONTINENTAL INFO SYS	5- 16	6 1/4	0	0.0
N	DPF INC	10- 15	11 3/4	+ 1/8	+1.0
O	PHOENIX AMERICAN INC	8- 17	8 1/4	0	0.0
O	SELECTERM INC	11- 21	13 1/2	- 1/2	-3.5
N	U.S. LEASING	28- 44	31 1/4	- 1/2	-1.5

COMPONENTS

N	ADVANCED MICRO DEV	23- 37	30	-2	-8.2
O	ADV'D SEMICONDUCTOR	21- 38	22 3/4	+2 1/4	+10.8
N	ANALOG DEVICES INC	20- 32	24 1/8	- 7/8	-3.5
O	ANALOGIC CORP	12- 31	12 3/4	+ 1/2	+4.0
N	APPLIED MAGNETICS CP	11- 37	11	- 1/2	-4.3
N	TERADYNE	24- 39	28 1/2	-1	-3.8

SOFTWARE & EDP SERVICES

O	ADVANCED COMP TECH	3- 8	2 7/8	+ 1/8	+6.5
N	ADVANCED SYSTEMS INC	14- 22	14 5/8	- 1/4	-1.6
B	ADS COMPUTERS INC	13- 32	16 3/4	+1 1/4	+8.9
O	AMERICAN SOFTWARE	13- 31	13	+ 1/4	+1.9
N	ANACOMP INC	2- 19	2 3/8	- 3/8	-13.6
O	ANALYSTS INTL CORP	5- 17	9 3/4	+ 1/2	+5.4
A	APPLIED DATA RES.	18- 37	19 7/8	+ 1/8	+0.6
O	ASK COMPUTER SYSTEMS	13- 21	18 1/2	+ 3/4	+4.2
B	ASTRADYNE COMP IND	1- 7	1 3/8	0	0.0
N	AUTOMATIC DATA PROC	30- 44	35	0	0.0
O	BGS COMPUTER ASSOC	9- 17	11 1/2	- 1/2	-4.1
O	COMPUTER ASSOC INT'L	15- 35	18	+ 1/2	+2.8
O	COMPUTER HORIZONS	8- 20	7 3/4	- 3/4	-8.8
O	COMPUTER NETWORK	5- 11	5	- 1/4	-4.7
N	COMPUTER SCIENCES	11- 23	12	- 1/4	-2.0
O	COMPUTER TASK GROUP	12- 19	14	+ 1/2	+3.7
O	COMPUTER USAGE	6- 18	7 5/8	+ 5/8	+8.9
O	COMPUTONE SYSTEMS	4- 23	5 1/8	+ 1/8	+2.5
O	CONSERV CORP	2- 16	2 3/8	0	0.0
O	COMSHARE	7- 14	8 7/8	+ 3/8	+4.4
N	CULLINET SOFTWARE	24- 90	35 1/2	-1 1/2	-4.0
O	CYCARE SYSTEMS INC	18- 25	18 1/2	+1 3/8	+8.0
N	ELECTRONIC DATA SYST	25- 42	40 3/8	+2 7/8	+10.6
O	HOGAN SYSTEM INC	12- 27	25 3/4	+2	+14.5
N	GENERAL ELECTRIC CO	45- 58	52 1/2	-1 5/8	-3.0
N	GTE CORP	36- 48	37	-1	-2.6
N	INFORMATICS INC	15- 32	21 7/8	- 3/8	-1.8
O	INFORMATION SCIENCE	5- 17	5	+ 1/4	+5.2
O	INFOTRON SYSTEMS CP	25- 43	28 1/2	- 1/2	-1.7
O	KEANE ASSOCIATES	5- 15	8 3/4	0	0.0
A	LOGICON	18- 31	22 7/8	+ 3/8	+1.6
O	MCI COMMUNICATIONS	6- 28	7 5/8	- 1/8	-3.1
O	MNGT SCI AMER INC	15- 33	19 1/2	+ 3/4	+4.0
O	MATHEMATICAL APP GRP	6- 18	5 1/2	-1	-15.3
O	MICOM SYSTEMS INC	31- 50	38 1/2	- 1/4	-0.6
O	MONCHIK-WEBER CP	6- 22	8 1/4	+ 3/4	+13.8
O	NATIONAL DATA CORP	14- 28	14 1/4	+ 1/8	+0.8
O	ON-LINE SOFTWARE INT	8- 29	8 1/2	+ 1/4	+3.0
O	PANSOPHIC SYSTEMS	11- 30	13 3/8	- 3/8	-2.7
N	PLANNING RESEARCH	12- 21	14 1/2	- 5/8	-4.1
O	POLICY MGNT SYSTS CP	22- 35	27 3/4	+1 1/4	+4.7
O	PROGRAMMING & SYS	4- 8	4 1/2	0	0.0
O	REYNOLDS & REYNOLD	29- 53	29 1/2	-1	-3.3
O	SEI CORP	13- 34	14 1/4	0	0.0
O	SOFTWARE MEDICAL SYST	8- 14	8	- 1/4	-3.0
O	SCIENTIFIC COMPUTERS	8- 14	8	0	0.0
O	SOFTWARE AG	9- 14	11 3/4	+1	+8.3
N	URS CORP	10- 18	10 1/4	0	0.0
N	UCCEL	7- 17	9 7/8	+ 7/8	+10.9

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P	AM INTERNATIONAL	2- 7	3 1/8	0	0.0
A	ANDERSON JACOBSON	7- 28	8 5/8	- 1/8	-1.4
O	AUTO-TROL TECHNOLOGY	14- 29	14	- 5/8	-4.2
O	BANCTEC INC	7- 22	7	- 3/4	-9.8
A	BEEHIVE INT'L	3- 15	7 7/8	- 1/8	-4.1
N	BOLT-BERANEK & NEW	17- 30	18 3/8	0	0.0
O	CAMBEX CORP	1- 3	1 1/8	- 1/8	-10.0
N	CENTRONICS DATA COMP	10- 28	10 5/8	+ 5/8	+6.2
A	CETEC CORP	7- 12	7 3/4	- 1/4	-3.1
A	COGNITRONICS	5- 20	5 1/4	- 1/8	-2.3
O	COMPUTER DEVICES INC	0- 16	1/2	0	0.0
O	COMPUTER TRANSCEIVER	2- 10	2 1/8	0	0.0
N	COMPUTERVISION CORP	29- 53	38 1/2	- 5/8	-1.5
N	COMRAC CORP	11- 24	11	-1 7/8	-14.5
A	DATAPRODUCTS CORP	18- 32	17	-2	-10.5
O	DATARAM CORP	8- 12	8	- 1/8	-1.5
O	DATA SWITCH CORP	15- 41	15	-2 1/2	-14.2
O	DATUM INC	6- 17	5 3/4	- 1/4	-4.1
O	DECISION DATA COMPUT	5- 18	8 1/2	+ 5/8	+8.1
O	DOCUTEL-OLIVETTI	7- 38	8 1/2	0	0.0
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O	IPL SYSTEMS INC	3- 14	2 1/2	- 1/2	-16.6
A	LUNDY ELECTRONICS	7- 19	8	- 1/2	-5.9
O	MEGADATA CORP	8- 15	12 3/4	+1 3/4	+15.9
A	MSI DATA CORP	12- 23	11 3/4	-2 1/2	-17.5
N	NASHUA CORP	18- 28	27 1/8	+ 3/8	+1.4
O	NETWORK SYSTEMS CORP	16- 34	22 1/2	+ 1/4	+1.1
N	NO AMERICAN PHILIPS	30- 40	31 7/8	+ 5/8	+2.0
N	NORTHERN TELECOM LTD	30- 48	33 1/4	-1 1/8	-3.2
O	OMEX	1- 4	3/8	+ 1/8	+25.0
N	PANASONIC CORP	13- 28	14 3/4	-1 1/4	-7.8
A	PENRIL CORP	5- 14	12 3/8	+ 1/8	+1.0
O	PHOENIX AMERICAN INC	8- 17	8 1/4	0	0.0
N	PLESSEY CO (ADR)	28- 41	28 1/4	-1 1/2	-5.0
O	PRINTRONIX INC	18- 34	18 3/8	+ 3/8	+1.9
O	RANTEK CORP	8- 23	8	- 1/4	-4.0
O	RECOGNITION EQUIP	11- 17	11 1/8	+ 5/8	+5.9
N	ROLM CORP	30- 80	38 3/8	+3 5/8	+10.4
N	SANDERS ASSOCIATES	38-120	43 1/2	- 1/2	-1.1
O	SCAN DATA	1- 3	3/8	0	0.0
O	SCAN-TRON CORP	12- 18	12 1/2	- 3/4	-5.6
N	SCIENTIFIC ATLANTA	9- 23	8 7/8	0	0.0
N	STORAGE TECHNOLOGY	9- 23	9 5/8	+ 1/2	+5.4
O	SYKES DATATRONICS	2- 13	3	- 1/8	-4.0
O	SYSTEMS & COMP TECH	20- 38	24 1/4	0	0.0
A	T BAR INC	7- 17	9 1/2	- 3/8	-3.7
O	TAB PRODUCTS CO	13- 20	14 1/2	- 3/4	-4.9
O	TANDON CORP	7- 35	6 5/8	-1 1/8	-14.5
A	TEC INC	6- 12	10	- 1/8	-1.2
N	TEKTRONIX INC	25- 87	33 1/4	+1 1/2	+4.7
N	TELEX	18- 32	26 7/8	+ 1/2	+1.8
O	TESDATA SYSTEMS CP	3- 17	3 3/8	- 1/2	-12.9
N	TIMEPLEX INC	14- 23	14 3/4	0	0.0
O	VISUAL TECHNOLOGY	9- 28	9 3/4	- 3/4	-7.1
N	AMERICAN BUS PRODS	17- 23	20 3/8	- 1/8	-0.6
N	BARRY WRIGHT	22- 33	26 1/2	- 7/8	-3.1
A	DUPLEX PRODUCTS INC	22- 27	23 3/4	0	0.0
N	ENNIS BUS. FORMS	18- 28	20 1/4	+ 1/2	+2.5
N	3M COMPANY	68- 80	76 1/4	-2 1/8	-2.7
N	MOORE CORP LTD	25- 51	37 3/4	+1	+2.7
O	STANDARD REGISTER	27- 35	33 3/4	0	0.0
N	WALLACE COMP SERVICE	23- 33	25 7/8	+ 1/8	+0.4

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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